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[Qualitative Review]

Factors that influence participation in physical activity for people with bipolar disorder: a synthesis of qualitative evidence

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ABSTRACT

Background

Mental health problems contribute significantly to the overall disease burden worldwide and are major causes of disability, suicide, and ischaemic heart disease. People with bipolar disorder report lower levels of physical activity than the general population, and are at greater risk of chronic health conditions including cardiovascular disease and obesity. These contribute to poor health outcomes. Physical activity has the potential to improve quality of life and physical and mental well-being.

Objectives

To identify the factors that influence participation in physical activity for people diagnosed with bipolar disorder from the perspectives of service users, carers, service providers, and practitioners to help inform the design and implementation of interventions that promote physical activity.

Search methods

We searched MEDLINE, PsycINFO, and eight other databases to March 2021. We also contacted experts in the field, searched the grey literature, and carried out reference checking and citation searching to identify additional studies. There were no language restrictions.

Selection criteria

We included qualitative studies and mixed-methods studies with an identifiable qualitative component. We included studies that focused on the experiences and attitudes of service users, carers, service providers, and healthcare professionals towards physical activity for bipolar disorder.

Data collection and analysis

We extracted data using a data extraction form designed for this review. We assessed methodological limitations using a list of predefined questions. We used the "best fit" framework synthesis based on a revised version of the Health Belief Model to analyse and present the evidence. We assessed methodological limitations using the CASP Qualitative Checklist. We used the GRADE-CERQual (Confidence in the

Evidence from Reviews of Qualitative research) guidance to assess our confidence in each finding. We examined each finding to identify factors to inform the practice of health and care professionals and the design and development of physical activity interventions for people with bipolar disorder.

Main results

We included 12 studies involving a total of 592 participants (422 participants who contributed qualitative data to an online survey, 170 participants in qualitative research studies). Most studies explored the views and experiences of physical activity of people with experience of bipolar disorder. A number of studies also reported on personal experiences of physical activity components of lifestyle interventions. One study included views from family carers and clinicians. The majority of studies were from high-income countries, with only one study conducted in a middle-income country. Most participants were described as stable and had been living with a diagnosis of bipolar disorder for a number of years.

We downgraded our confidence in several of the findings from high confidence to moderate or low confidence, as some findings were based on only small amounts of data, and the findings were based on studies from only a few countries, questioning the relevance of these findings to other settings. We also had very few perspectives of family members, other carers, or health professionals supporting people with bipolar disorder. The studies did not include any findings from service providers about their perspectives on supporting this aspect of care.

There were a number of factors that limited people's ability to undertake physical activity. Shame and stigma about one's physical appearance and mental health diagnosis were discussed. Some people felt their sporting skills/competencies had been lost when they left school. Those who had been able to maintain exercise through the transition into adulthood appeared to be more likely to include physical activity in their regular routine. Physical health limits and comorbid health conditions limited activity. This included bipolar medication, being overweight, smoking, alcohol use, poor diet and sleep, and these barriers were linked to negative coping skills. Practical problems included affordability, accessibility, transport links, and the weather. Workplace or health schemes that offered discounts were viewed positively. The lack of opportunity for exercise within inpatient mental health settings was a problem.

Facilitating factors included being psychologically stable and ready to adopt new lifestyle behaviours. There were positive benefits of being active outdoors and connecting with nature. Achieving balance, rhythm, and routine helped to support mood management. Fitting physical activity into a regular routine despite fluctuating mood or motivation appeared to be beneficial if practised at the right intensity and pace. Over- or under-exercising could be counterproductive and accelerate depressive or manic moods. Physical activity also helped to provide a structure to people's daily routines and could lead to other positive lifestyle benefits. Monitoring physical or other activities could be an effective way to identify potential triggers or early warning signs. Technology was helpful for some. People who had researched bipolar disorder and had developed a better understanding of the condition showed greater confidence in managing their care or providing care to others. Social support from friends/family or health professionals was an enabling factor, as was finding the right type of exercise, which for many people was walking.

Other benefits included making social connections, weight loss, improved quality of life, and better mood regulation. Few people had been told of the benefits of physical activity. Better education and training of health professionals could support a more holistic approach to physical and mental well-being. Involving mental health professionals in the multidisciplinary delivery of physical activity interventions could be beneficial and improve care. Clear guidelines could help people to initiate and incorporate lifestyle changes.

Authors' conclusions

There is very little research focusing on factors that influence participation in physical activity in bipolar disorder. The studies we identified suggest that men and women with bipolar disorder face a range of obstacles and challenges to being active. The evidence also suggests that there are effective ways to promote managed physical activity. The research highlighted the important role that health and care settings, and professionals, can play in assessing individuals' physical health needs and how healthy lifestyles may be promoted. Based on these findings, we have provided a summary of key elements to consider for developing physical activity interventions for bipolar disorder.

PLAIN LANGUAGE SUMMARY

Factors that influence physical activity in bipolar disorder

Key messages

We found few studies that explored factors that influence participation in physical activity for people with bipolar disorder. The studies we found suggested that regular physical activity can be beneficial for people with bipolar disorder, but there are some obstacles and challenges to as well as effective ways of promoting being active.

What was the aim of this synthesis?

The aim of this qualitative evidence synthesis was to explore the factors that promote physical activity for people with bipolar disorder. We searched for and analysed qualitative studies of views and experiences of people with bipolar disorder, health professionals, and family/

carer perspectives. We included 12 studies involving a total of 592 participants (422 participants who contributed qualitative data to an online survey, 170 from qualitative studies).

What was studied in this synthesis?

Many people with bipolar disorder have physical health problems, and increasing physical activity may help improve their physical and mental well-being. We studied qualitative research (research that gathers participants' experiences, beliefs, and behaviour) that aimed to promote physical activity for bipolar disorder and sought views from service users, health professionals, and family/carers. The review authors, who are researchers and/or health professionals working in the area of mental health and physical activity, identified this review topic because of limited research published in the area.

What are the main findings of this synthesis?

We included 12 studies conducted in Europe, North and South America, and Australia. Eleven studies were based in high-income countries (Australia, Belgium, Canada, Spain, the UK, and the USA), and one was from a middle-income country (Brazil). Most studies explored the views and experiences of physical activity in people with bipolar disorder. There were more women than men in the included research, and participants were described as stable with regard to their disease and interested in making lifestyle changes to improve their health.

We downgraded our confidence from high to moderate or low confidence because some findings were based on small amounts of data or on studies from only a few countries, questioning how applicable these findings are to other settings. There were also very few perspectives from family members, other carers, or health professionals. There were no findings from service providers.

In general, people had limited knowledge of the benefits of physical activity for managing mental health symptoms and of their physical health needs. Many people experienced shame and stigma about their physical and mental health, which contributed to anxiety and embarrassment and negative ways of coping, such as socially isolating. Taking medication, being overweight, smoking, and sleep were challenges to being more active. Lack of time and money, bad weather, poor transport, and personal safety concerns were also highlighted as problems. Tackling the sharp reduction in activity levels when young people leave education is a significant public health issue, particularly for young women.

Workplace or healthcare schemes were considered beneficial. Being psychologically ready to be active and having social support and encouragement was helpful. People enjoyed connecting with nature and making social connections, and reported other benefits including weight loss, improved quality of life, and better mood regulation. Finding an enjoyable physical activity and incorporating it into a regular routine at the right level and intensity contributed to mood management and improved well-being. Offering safe, accessible, inclusive, and low-cost opportunities to be active could help reduce stigma and promote physical activity and social connections.

Clearer guidelines about the benefits of physical activity should inform health and care treatment plans, and involving teams across fields of speciality with knowledge and experience in bipolar disorder could help support people to increase physical activity levels. Adjustments and support may need to be made to establish a beneficial activity programme and balanced routine. Interventions that take a phased, step-by-step approach to introduce lifestyle changes, for example increasing physical activity, healthy eating, and reducing risk behaviours (e.g. stopping smoking), are practical and effective.

More research is required to establish the views and experiences of family members and carers and health and care professionals, as well as people who do not feel ready to engage in physical activity.

How up-to-date is this review?

We searched for studies published up to March 2021.

SUMMARY OF FINDINGS

Summary of findings 1. Summary of qualitative findings

Summary of review findings	Studies contributing to the review finding	GRADE-CERQual assessment of confidence in the evidence	Explanation of GRADE-CERQual assessment
Theme 1. HBM Domain 1 - Threats: Perceived susceptibility - accepting mental health diagnosis, physical health needs & perceptions of physical health limits			
Finding 1: Being psychologically ready to engage in physical activity is important. Being clinically stable was considered an important element of being 'ready' to engage in lifestyle/physical activity interventions from the perspectives of men and women with bipolar disorder and health care professionals. This also referred to having accepted and 'come to terms' with their bipolar disorder diagnosis. More research is required in populations where they do not wish or feel the need to participate in physical activity.	Bauer 2018; Bueno-Antequera 2018; Chalmers 2020; Filia 2012; Hensley 2008; Murnane 2016; Pereira 2019; Wright 2012	**High confidence**	Graded as high confidence because of no/very minor concerns about methodological limitations, coherence and relevance, and moderate concerns about adequacy
Finding 2. The physical health needs of men and women with bipolar disorder are often not appropriately assessed and addressed despite their increased risk of cardiovascular disease, diabetes, and obesity and higher prevalence of associated health risk behaviours. Poor mental health may also impact on people's capacity to initiate or adhere to treatment guidelines. Further messaging is required to support people with bipolar disorder to identify and understand their physical health needs; this extends to healthy eating, the impact of medication, and managing the physical demands/limits that can be characteristic of bipolar disorder and its treatment.	Bauer 2018; Bueno-Antequera 2018; Chalmers 2020; Filia 2012; Pereira 2019	**Moderate confidence**	Downgraded to moderate confidence because of no/very minor concerns about methodological limitations and relevance, minor concerns about coherence, and moderate concerns about adequacy
Finding 3. People identified the influence of other factors that affected physical activity levels; this included high prevalence rates of comorbid health risks and negative triggers that could lead to setbacks. There are gender differences that require consideration in lifestyle intervention design, such as the greater risks associated with smoking in women, which may require a gender-sensitive approach.	Bueno-Antequera 2018; Chalmers 2020; Filia 2012; Hensley 2008; Pereira 2019	**Moderate confidence**	Downgraded to moderate confidence because of minor concerns about methodological limitations, no/very minor concerns about coherence and relevance, and moderate concerns about adequacy
Theme 2. HBM Domain 2 - Expectations: Perceived barriers to, and benefits of, physical activity and perceptions about self-efficacy, motivation and self-esteem			
Finding 4: Stigma and shame related to bipolar disorder and physical activity needs to be tackled. This presents in a variety of ways including anxiety, embarrassment, and negative coping skills, such as social isolation being used as a form of self-protection. Strategies to combat societal and self-stigma are central to encouraging men and women with bipolar disorder to access interventions.	Bauer 2018; Filia 2012; Hensley 2008; Murnane 2016; Pereira 2019	**High confidence**	Graded as high confidence because of no/very minor concerns about methodological limitations, coherence, and relevance, and moderate concerns about adequacy

Finding 5: There are financial constraints associated with engaging in physical activity. Mental illness can have a considerable impact on the economic well-being of individuals and families, and cost was identified as a barrier to engaging in both physical activity and implementing other healthy behaviours. Costs associated with equipment, clothing, or access to exercise settings can be a problem, as can spending spiralling out of control when unwell. Health insurance or employment perks and low-cost exercise options such as walking could be promoted.	Bauer 2018; Bueno-Antequera 2018; Chalmers 2020; Murnane 2016; Pereira 2019; Suto 2010; Switsers 2018; Wright 2012	**High confidence**	Graded as high confidence because of no/very minor concerns about methodological limitations, coherence, and relevance, and moderate concerns about adequacy
Finding 6: Practical challenges to regular physical activity include bad weather, lack of access or transport problems, and feeling unsafe. Creating accessible, low-cost, and safe settings could increase access and help reduce stigma for both men and women with bipolar disorder.	Bauer 2018; Chalmers 2020; Hensley 2008; Pereira 2019	**Moderate confidence**	Downgraded to moderate confidence because of minor concerns about methodological limitations, no/very minor concerns about coherence and relevance, and moderate concerns about adequacy
Finding 7. The positive benefits of physical activity for bipolar disorder include physical health benefits and increased healthy behaviours, mood regulation, and making social connections. Men and women also reported wider benefits for their quality of life, such as connecting with others and feeling a sense of achievement, and physical health benefits including weight loss and improved cardiovascular health. Incorporating physical activity into a regular routine also helped establish new routines and habits that promoted well-being, such as improved sleep, healthy eating, and reducing negative coping strategies.	Bauer 2018; Bueno-Antequera 2018; Chalmers 2020; Eden 2022; Filia 2012; Hensley 2008; Murnane 2016; Pereira 2019; Switsers 2018; Wright 2012	**High confidence**	Graded as high confidence because of no/very minor concerns about methodological limitations, coherence, and relevance, and moderate concerns about adequacy
Finding 8. Perceptions about lack of skill, mastery, or confidence can prevent men and women with bipolar disorder from being active.While physical activity recommendations are often mandatory in education settings up to a certain age, once leaving school, people are not well-supported to maintain healthy physical activity habits into lifelong healthy behaviours. Girls in particular are more likely to give up sport during transitions.	Bauer 2018; Chalmers 2020; Filia 2012; Hensley 2008; Pereira 2019; Wright 2012	**High confidence**	Graded as high confidence because of no/very minor concerns about methodological limitations, coherence, and relevance, and moderate concerns about adequacy
Finding 9. Taking personal responsibility for physical activity was important. This included being able to monitor and respond to changes in moods and symptoms and knowing when and where to seek support, whether this was self-led or available from other types of support (e.g. professionals). This corresponds to 'being ready'. Helpful support could be provided in the form of feedback to help set and track goals and build self-confidence.	Bauer 2018; Eden 2022; Filia 2012; Hensley 2008; Murnane 2016; Pereira 2019; Suto 2010; Wright 2012	**High confidence**	Graded as high confidence because of no/very minor concerns about methodological limitations, coherence, and relevance, and moderate concerns about adequacy
Theme 3. HBM Domain 3 - Cues to Action: Messaging from public health, professionals, support networks and the role of monitoring			
Finding 10. Clear guidelines are beneficial for initiating and incorporating lifestyle changes. These can help inform men and women with bipolar disorder and their carers, but also influence how care is delivered by health and social care.	Bauer 2018; Filia 2012; Hensley 2008; Pereira 2019; Suto 2010	**Moderate confidence**	Downgraded to moderate confidence because of minor concerns about methodological limitations, no/

			very minor concerns about coherence and relevance, and moderate concerns about adequacy
Finding 11. Men and women who understood bipolar disorder had a better insight into managing and improving care using physical activity. Having knowledge of the symptoms and the impact of medication and associated comorbidities improved. Where knowledge of psychopathology was evident, better outcomes were observed. Different levels of intensity of physical activity could impact on mood, and adjustments needed to be made to manage this. This was also reflected when physical activity levels dropped or completely stopped and negatively affected mood and motivation. Participants had to monitor and work at healthy lifestyles to maintain and manage wellness. More needs to be learned about those with bipolar disorder not ready or willing to engage in physical activity.	Bauer 2018; Chalmers 2020; Eden 2022; Hensley 2008; McCullough 2021; Suto 2010; Switsers 2018; Wright 2012	**High confidence**	Graded as high confidence because of no/very minor concerns about methodological limitations, coherence, and relevance, and moderate concerns about adequacy
Finding 12. Physical activity should form part of a treatment plan for both men and women with bipolar disorder. Messaging from professionals tended to concentrate on the benefits of weight loss but did not promote potential mental health benefits. Better training and education of health and social care professionals could encourage the promotion of physical activity as beneficial for the management of bipolar disorder. Offering multicomponent interventions is feasible, with sequenced phases that can help tackle a range of lifestyle behaviours incrementally that can impact on a person's health and well-being commonly associated with the symptoms of bipolar disorder (e.g. smoking, nutrition, exercise, sleep).	Bauer 2018; Chalmers 2020; Eden 2022; Pereira 2019; Suto 2010; Wright 2012	**Moderate confidence**	Downgraded to moderate confidence because of no/very minor concerns about methodological limitations and relevance, minor concerns about coherence, and moderate concerns about adequacy
Finding 13. The enabling role of trained, multidisciplinary professionals was highlighted. Having the right health and social care professionals can deliver a holistic approach to care. Trained mental health professionals involved in physical activity interventions helped improve understanding of motivation and encouragement and being visible/available should additional support be required. There was evidence of doctors and general practitioners promoting physical activity to improve some of the side effects of medication, managing mood, and reducing other lifestyle risks (e.g. smoking, nutrition). Multidisciplinary teams that offer support from a range of different professions including psychology, psychiatry, nutrition, sports medicine, lifestyle coaching, dietetics, and fitness trainers were considered important to providing effective care and support. Establishing support across other health and social care providers to promote harmonious relations and shared messaging between services could be effective.	Bauer 2018; Chalmers 2020; Filia 2012; Hensley 2008; Pereira 2019; Suto 2010; Wright 2012	**High confidence**	Graded as high confidence because of no/very minor concerns about methodological limitations, coherence, and relevance, and moderate concerns about adequacy
Finding 14. Finding the right support could facilitate participation and encourage men and women to be active. Having support, whether from professionals or friends and family, was important.	Chalmers 2020; Eden 2022; Hensley 2008; Pereira 2019; Suto 2010; Wright 2012	**High confidence**	Graded as high confidence because of no/very minor concerns about methodological limitations, coherence, and relevance,

			and moderate concerns about adequacy
Finding 15. Mood regulation is an important aspect of managing symptoms of bipolar disorder, and monitoring mood and physical activity, including the use of technology, may be helpful for men and women with bipolar disorder. This can be used to help understand the role of physical activity in the treatment of mental and physical health problems and support health and social care professionals to provide tailored care. Not all healthcare settings are set up to maximise the potential of patient-generated data to monitor mental health problems. It is also important to consider that monitoring is not useful for everyone.	Bauer 2018; Chalmers 2020; Murnane 2016; Suto 2010; Switsers 2018	**High confidence**	Graded as high confidence because of no/very minor concerns about methodological limitations, coherence, and relevance, and moderate concerns about adequacy
Theme 4. New Domain - Finding what works: Finding the right type of exercise in the right setting with balance and structure to improve sustainability			
Finding 16. Accessible, sustainable interventions and finding the right type of exercise were all identified as important. For many women and men with bipolar disorder, the right type of exercise was walking.	Bauer 2018; Chalmers 2020; Eden 2022; Filia 2012; Hensley 2008; Pereira 2019; Suto 2010; Switsers 2018; Wright 2012	**High confidence**	Graded as high confidence because of no/very minor concerns about methodological limitations, coherence, and relevance, and moderate concerns about adequacy
Finding 17. Finding balance, rhythm, structure, and establishing a regular physical activity routine was beneficial. Rhythm and routine brought balance and structure for men and women with bipolar disorder. Incorporating regular physical activity into a daily routine offered structure and purpose within a daily schedule, but also the physical aspect of undertaking repetitive, rhythmic exercise like walking and running contributed to balancing and regulating mood. There was a careful balance to achieve to avoid over- or under-exercising, which could exacerbate mania or depression. There is some evidence that circadian rhythms are disturbed in bipolar disorder, and it may be that rhythm provides some contribution to help reset this balance.	Bauer 2018; Chalmers 2020; Eden 2022; Hensley 2008; McCullough 2021; Murnane 2016; Pereira 2019; Suto 2010; Switsers 2018; Wright 2012	**High confidence**	Graded as high confidence because of no/very minor concerns about methodological limitations, coherence, and relevance, and moderate concerns about adequacy
Finding 18: Appropriate coping strategies may support engagement in physical activity and other health-promoting behaviours. Negative coping mechanisms or a lack of coping strategies for men and women with bipolar disorder can affect engagement. Providing support to develop alternative approaches can be beneficial.	Chalmers 2020; Filia 2012; Hensley 2008	**Low confidence**	Downgraded to low confidence because of minor concerns about methodological limitations, moderate concerns about coherence and adequacy, and no/very minor concerns about relevance
Finding 19: Connecting to nature when undertaking physical activity may convey additional benefits, including increasing the opportunity for social contact, engaging with nature, and reducing stress, that are often associated with spending time outdoors.	Chalmers 2020; Eden 2022; Suto 2010; Wright 2012	**Moderate confidence**	Downgraded to moderate confidence because of no/very minor concerns about methodological limitations and relevance, minor concerns about coherence, and moderate concerns about adequacy

Finding 20. There are some considerations for designing interventions that promote physical activity for bipolar disorder. These include sequencing multicomponent lifestyle changes, technology, incentives, and health promotion strategies that are gender-sensitive. Physical activity is one aspect of promoting well-being for people with bipolar disorder and can be a helpful way to manage symptoms. Sequencing multicomponent interventions that tackle a range of health behaviours is feasible and may be beneficial for improving overall mental and physical health.	Bauer 2018; Bueno-Antequera 2018; Chalmers 2020; Filia 2012; Hensley 2008; McCullough 2021; Murnane 2016; Pereira 2019; Suto 2010	**High confidence**	Graded as high confidence because of no/very minor concerns about methodological limitations, coherence, and relevance, and moderate concerns about adequacy

GRADE-CERQual: the GRADE-CERQual (Confidence in the Evidence from Reviews of Qualitative research) approach provides guidance for assessing how much confidence to place in findings from systematic reviews of qualitative research (or qualitative evidence syntheses).
HBM: the Health Belief Model is a theory of behaviour change developed to explain and help predict health-related behaviours, particularly related to the uptake of health services. The theoretical model identifies different domains to categorise the potential threats and expectations of a health behaviour and consider the cues or stimuli that will lead to action.

BACKGROUND

Physical activity has many benefits, but recent figures report that around 20 million adults (39%) in the UK are physically inactive (BHF 2017). Worldwide, 1400 million people do not meet the weekly recommendations for physical activity established by the World Health Organization (WHO) (WHO 2010). Physical inactivity increases the risk of many adverse health conditions and is a significant cause of premature mortality (Lee 2012). Conservative estimates suggest that in 2013, physical inactivity cost healthcare systems USD 53,800 million worldwide; contributed to USD 13,700 million in loss of productivity; and was responsible for 13.4 million disability-adjusted life years (DALYs) (Ding 2016). Being physically active has the potential to protect against depression (Schuch 2018), and lower the risk of breast cancer, colon cancer, diabetes, ischaemic heart disease, and ischaemic stroke (Kyu 2016). Larger reductions in risks require significantly higher levels of physical activity than the minimum recommended level of 600 metabolic equivalent minutes per week (the equivalent of 150 minutes of brisk walking or 75 minutes of running) (Kyu 2016). Recommended activity levels are higher for children and young people than for adults (WHO 2012). High levels of sedentary behaviour in the youth population and their association with poor physical and mental health is a concern (Hoare 2016). Sedentary behaviour, independent of physical activity, has also been implicated in significant health risks including increased risk of diabetes, cardiovascular disease, and cardiovascular and all-cause mortality (Wilmot 2012).

Mental health problems contribute significantly to the overall disease burden worldwide and are major causes of disability, suicide, and ischaemic heart disease. People with ill mental health report lower levels of physical activity, and physical activity levels for those with bipolar disorder are considerably lower compared to the general population (Vancampfort 2016; Vancampfort 2017). People with bipolar disorder are at greater risk of chronic health conditions including cardiovascular disease and obesity, and many have co-occurring medical conditions (comorbid conditions) caused by lifestyle behaviours (e.g. smoking, hazardous substance misuse, sedentary behaviour) that can lead to poor health outcomes and impact negatively on their physical health (De Hert 2011; Kilbourne 2007; Osborn 2007; Roshanaei-Moghaddam 2009; Sylvia 2011). People living with mental health conditions, including bipolar disorder, are also more likely to experience poverty (Elliott 2016). The multidimensional effects of poverty can influence judgement and decision-making about important lifestyle behaviours, including personal choices about exercise and nutrition (Mullainathan 2014; Wilkinson 2018).

While there may be a range of social and genetic determinants of mental health disorders (Cross-Disorder Group 2013; WHO 2014), being physically active may have positive benefits and help improve the health of young people and adults with severe and enduring mental health conditions (Ströhle 2009). Based on secondary analysis of available data, physical activity has been shown to be potentially as effective as many drug interventions (e.g. statins, beta blockers) at preventing cardiovascular disease mortality (Naci 2013). However, evidence of the benefits of physical activity on mental health symptoms in bipolar disorder is limited (Stubbs 2018a; Thomson 2015). Stubbs and colleagues' meta-review of physical activity as a treatment for severe mental illness identified two systematic reviews with people with bipolar disorder (Stubbs 2018a); one found some evidence that exercise may improve depressive symptoms and reduce stress but observed no changes in function, general symptoms, or clinical global impression (de Sá Filho 2015), and the second review reported weight loss in the treatment group compared to the control (Thomson 2015).

A number of challenges to physical activity are identified in the qualitative literature. They include low levels of motivation, poor self-perception, and inexperience/lack of competence (Cole 2010; Glowacki 2017). Practical issues such as cost (associated with unemployment) and access (including transport) can create obstacles (Wynanden 2012). Aspects that help facilitate physical activity include recognition of the psychological and physical benefits (Firth 2016), and good social and peer support networks (Schuch 2016). Gaining mastery and growing competency also encourages people to continue participation (Carless 2008; Firth 2016; Hodgson 2011). For young people, many of these barriers and facilitators are shared (e.g. cost, time, transport, infrastructure, social support, motivation), but additional challenges may be faced (Martins 2015). These can include negative associations with the competitive nature of physical activity within school and the pressure of winning/losing in front of their peer group or vested adults. Activity often reduces as children age (Dunmith 2011), and at the transition periods from primary to high school (10 to 12 years old) and high school to labour market entry (16 to 18 years old) (Bélanger 2011; Coleman 2008).

Bipolar disorder

Bipolar disorder consists of severe mood disturbances, neuropsychological deficits, and affects on functioning (Rowland 2018). It is characterised by episodes of depression (feeling very low and lethargic) and mania (feeling very high and overactive). Symptoms can be diverse and depend on whether a depressive or manic mood is being experienced; common symptoms can include fluctuating energy levels, episodes of compulsive behaviour, and substance use problems (Hirschfield 2000). During periods of intense depression or mania, a person may experience psychotic symptoms that can lead to serious disturbances in their thinking, emotions, and behaviours. Each extreme episode can last for several weeks or longer and can interfere with everyday life. In 2017, there were 59.4 million cases of the disorder recorded, accounting for 121 million DALYs (Rehm 2019); it is associated with premature mortality from medical comorbidities and suicide. It may take some time for someone to be diagnosed correctly, but lifetime prevalence of bipolar disorder is estimated to affect 2.4% of the population (Merikangas 2011), and occurs in 1% to 3% of the youth population (Birmaher 2013). The mean age of onset is in the early 20s (Merikangas 2007), but several studies report that up to 60% of adult patients report the onset of their mood symptoms before the age of 21 (Baldessarini 2010; Chengappa 2003; Goodwin 2007). It appears to be equally distributed across both sex and ethnicity (Tsuchiya 2003); however, presentation of the disorder may vary in patients with later onset, including higher rates of psychiatric and medical comorbidities (Cassidy 2002; Leboyer 2005). There are a number of risk factors for bipolar disorder including genetic and environmental factors (Craddock 1999; Craddock 2013; Marangoni 2016), but causation is difficult to establish (Rowland 2018). Environmental risk factors include stressful life events (Tsuchiya 2003), childhood maltreatment (Bortolato 2017; Garno 2005), and substance misuse (Post 2013). It is also associated

with other medical conditions including inflammatory or stress-related disorders, such as irritable bowel syndrome and asthma (Bortolato 2017; Wu 2016). Pharmacological medication often prescribed for bipolar disorder includes sedating antidepressants, sedating atypical antipsychotics, and mood stabilisers that can lead to increased appetite and associated weight gain (Mangge 2019). Uncontrolled weight gain and greater risk of developing cardiovascular disease are associated with bipolar disorder. This may be related to a range of interacting factors including the side effects of psychopharmacotherapy, changes in metabolism, and lifestyle issues such as inactivity, diet, smoking, and other drug use (Yoshimi 2016).

Description of the topic

Physical activity is defined as any bodily movement produced by contraction of skeletal muscle that increases energy expenditure above a basal level (Caspersen 1985). This includes walking, cycling, sports, and other active forms of recreation (e.g. dance, gardening, yoga, tai chi). Exercise, a subcategory of physical activity, is defined as planned, structured, and repetitive physical activity that is aimed at improving or maintaining one or more components of physical fitness (Caspersen 1985; Garber 2011; US Dept of HHS 2008). Physical inactivity is a global problem, and understanding the reasons behind the motivation to be active forms part the WHO's 2018-2030 technical package to increase physical activity (WHO 2018). Activity rates are much lower for people with bipolar disorder than the general population (Vancampfort 2017). In a review and meta-analysis of sedentary behaviour and physical activity in schizophrenia, bipolar disorder, and major depressive disorder, people with bipolar disorder were the most active physically, but were also significantly more sedentary (615 min per day, 95% confidence interval (CI) 456 to 774; $P < 0.001$, $I^2 = 99.2$) than those with schizophrenia (493 min per day, 95% CI 400 to 586) or major depressive disorder (414 min per day, 95% CI 323 to 505) (Vancampfort 2017). Although there is substantial evidence for the positive impact that physical activity has on mental health (Penedo 2005), there are few good-quality large-scale randomised trials in people with bipolar disorder (Stubbs 2018a). Further exploration of the relationship between bipolar disorder and physical activity and its impact on mood symptoms is needed (Thomson 2015); however, given the high rate of medical comorbidities, physical activity could also potentially play an important role in both the prevention and treatment of physical health conditions.

Physical activity is relatively easy to deliver in home-based, clinical, or community settings, and carries a relatively low risk of negative side effects (Wright 2012). Potential negative side effects include physical activity becoming addictive, which can lead to 'muscle dysmorphia', the use of anabolic-androgenic steroids and their associated risks, intense exercise and mood disturbances, and overtraining syndrome (Peluso 2005). A number of methodological shortcomings in randomised controlled trials have made it difficult to assess how effective physical activity is in a clinical setting (Ellis 2007; Faulkner 1999; Thomson 2015). The overall health benefits of being more active can have a positive impact on quality of life and well-being. Physical activity is increasingly used in consultant, allied health professional, and general practitioner referrals as a treatment option or as a complementary therapy (Price 2018), and exercise referral schemes are outlined in public health guidance by the National Institute for Health and Care Excellence (NICE) and recommended as treatment by the European Psychiatric Association (EPA) (NICE 2014; Stubbs 2018a).

Many factors can create challenges to or facilitate physical activity. Barriers may be increased for people with bipolar disorder. Better understanding of what motivates or inhibits individuals to be physically active could help practitioners work more effectively with this client group (Wheeler 2018), and help to establish realistic physical activity goals within a treatment programme that does not exacerbate symptoms (Ehrlich 2015; Young 2017). In this qualitative evidence synthesis (QES) we synthesised the qualitative evidence for the factors that create barriers or facilitators of physical activity for people with bipolar disorder and outlined what helps people with lived experience of this condition to be more active to benefit their physical and mental health. This QES complements another QES that will consider the facilitators and barriers for people with anxiety and depression (McCartan 2020).

Why is it important to do this review?

Very low levels of physical activity remain a public health concern. Understanding more about the factors that create barriers to or facilitate physical activity could help inform the design and development of interventions to improve the physical and mental health of young people and adults with bipolar disorder. This QES used the Health Belief Model (HBM) to examine these factors and outline what may help people with lived experience of bipolar disorder to be more physically active. The HBM is a theory of behaviour change developed to explain and help predict health-related behaviours, particularly related to the uptake of health services. The HBM has been used as a conceptual framework in health behaviour research since the 1950s to explore why people fail to participate in programmes designed to prevent and detect disease (Glanz 2010; Hochbaum 1958; Rosenstock 1960; Rosenstock 1974). It can help explain the change and maintenance of health-related behaviours and has been used as a guiding framework for many health-behaviour interventions (Jones 2014). In this QES, we:

- examined how factors such as age, gender, class, ethnicity, mental health diagnosis, and comorbid conditions affected participation;
- considered people's perceptions about their physical and mental health needs and identified barriers and facilitators to physical activity;
- considered which cues influence people to take action; and
- sought to understand why interventions worked (or not), why people engaged (or not), and how carers, service providers, and health professionals viewed, supported, or influenced treatment engagement.

A QES can help to identify the factors influencing the success of interventions including the attitudes and experiences of service users, their carers, service providers, and health professionals. Two systematic reviews of exercise interventions for bipolar disorder concluded that lifestyle interventions including a physical activity component can be acceptable and efficacious for bipolar disorder (Bauer 2016; Melo 2016). These systematic reviews drew evidence from measures including quality of life, changes in depressive symptoms, and increased functioning, but this evidence told us little about the motivations, challenges, and facilitators to engaging in physical activity. Firth and colleagues conducted

a systematic review and meta-analysis of quantitative data on the motivating factors and barriers towards exercise in serious mental illness (Firth 2016). However, there is less information available from qualitative studies. Developing a more nuanced understanding of how accessible physical activity is for people with bipolar disorder could bring important knowledge to the design, development, and implementation of interventions. A QES provides the opportunity to add rich and contextual data and contribute to the knowledge base to help understand why and how best to increase physical activity levels among people with bipolar disorder without exacerbating symptoms. It provides a greater insight into the factors that create barriers to and facilitators of physical activity by exploring the lived experience of service users, carers, service providers, and practitioners to help highlight common beliefs, misconceptions and fears, and benefits of physical activity participation.

How the intervention might work

Physical activity and exercise may help to reduce mental health symptoms for bipolar disorder (Kucyi 2010), but the evidence is limited (Stubbs 2018a; Thomson 2015), and the cause-and-effect relationship has not been clearly established (Bauer 2016). However, being active may improve functioning and reduce depressive symptoms (Hayes 2017; Sylvia 2013a; Sylvia 2013b), and stimulate neurogenesis, metabolism, and vascular function (Cotman 2007; Ernst 2006). Physical activity may increase feelings of well-being by stimulating the release of endorphins (Steinberg 1985), and for those with mental health problems, it can reduce fatigue, improve sleep, and help with insomnia (Herring 2015; Rosenbaum 2015; Strid 2016). Being physically active can also contribute to physical changes (Bartels 2018), which in turn can boost self-esteem and positive perceptions of oneself. Physical activity can help deliver positive social experiences (Carless 2008); group-based activities can extend social networks and support systems for people who may have felt isolated because of their illness and feelings of low self-worth. Being active has also been linked to increased ratings of quality of life, pleasure, and motivation (Bauer 2016; Melo 2016). There is also evidence for its effectiveness as an adjunct therapy to therapeutic interventions such as cognitive behavioural therapy for bipolar disorder (Sylvia 2013b).

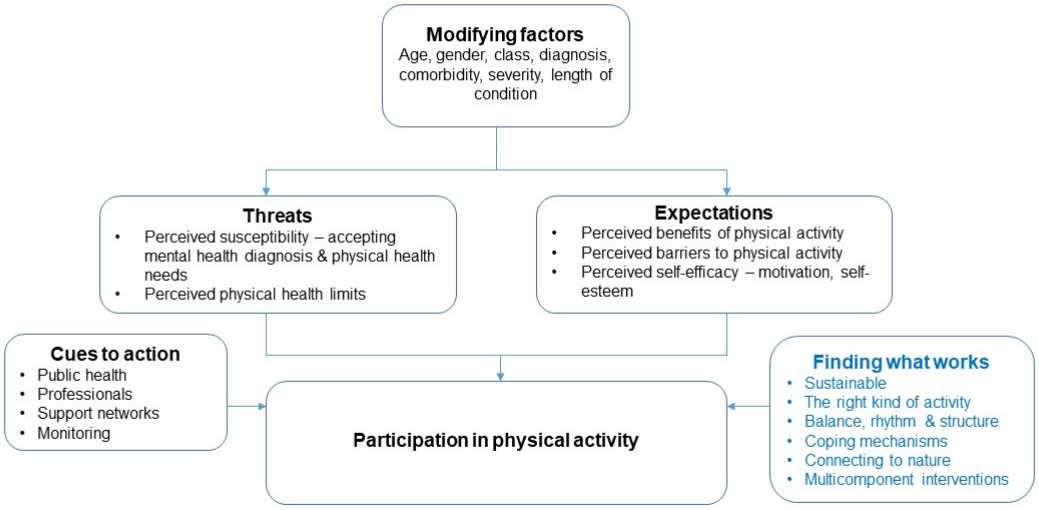
Increasing physical activity to improve the health of people with bipolar disorder will often require specific behavioural changes (such as a decrease in sedentary behaviour and an increase in physical exertion). We wanted to understand how people with bipolar disorder adopt or reject positive physical activity behaviours. Applying a theoretical model of behaviour change can help understand the sequence of these mechanisms and identify what factors trigger positive change. This will identify which physical activity interventions are likely to be effective; to date, insufficient attention has been given to analysing behaviour change theories as a starting point for developing an intervention (Johnston 2008).

The HBM consists of six key concepts that predict why people take action to prevent, screen for, or control illness conditions (Champion 2008), and acknowledges the range of modifying variables such as demographic, socio-economic, and structural factors that may also influence behaviour. It has been validated in a range of domains and populations (Carpenter 2010; Janz 1984). Although this model has its critics (Orji 2012), it can be a useful way to frame the barriers and facilitators for physical activity in bipolar disorder. The theoretical model identifies six domains which categorise the potential threats and expectations of a health behaviour and consider the cues or stimuli that will lead to action. Four additional domains were developed by Orji 2012 to improve its predictive power: concern for appearance; consideration of future consequences; perceived importance; and self-identity. The six key concepts are as follows.

- **Perceived susceptibility:** the perceived risk of getting a condition or disease. This includes a person's awareness and acceptance of their mental health diagnosis and any comorbid physical health needs.
- **Perceived severity:** the probability that a person will change their behaviour to avoid the consequence depends on how serious a condition they consider the consequence to be. How serious is the physical health condition when mental health is often the primary diagnosis? Does the service user understand the physical health risks associated with their mental health condition?
- **Perceived benefits:** the perception of the good things that could happen from taking part in specific behaviours. What is in it for the participant? People do not want to give up something they enjoy if they do not get something in return.
- **Perceived barriers:** the perception of the difficulties and costs of performing behaviours. This could relate to both intrinsic (shame, stigma, perceived lack of ability, lack of appropriate skills and knowledge) and extrinsic factors (cost, equipment, impact of medication, comorbid conditions).
- **Cues to action:** exposure to factors that lead to action - public health messages, relationships with healthcare professionals, support from social/family systems, physical health checks, reminders, telemonitoring.
- **Self-efficacy:** confidence in one's ability to take action. Low levels of motivation and self-esteem.

See Figure 1.

Figure 1. Health Belief Model for participation in physical activity for people with bipolar disorder.



Perceived susceptibility and severity of physical health problems

Perceptions about the susceptibility and severity of physical health problems in bipolar disorder may be affected by current healthcare delivery. People with severe and enduring mental health problems may not be aware of all of their physical health needs; these can be neglected (Fagiolini 2009; Kisely 2007; Mitchell 2009; Tidemalm 2008), and there are inequalities in access to, use, and delivery of healthcare in this population (de Hert 2013; Lawrence 2010). People with severe mental illness are less likely to receive health promotion interventions and other forms of preventive care such as routine cancer screening (Naylor 2016) and smoking cessation treatments (Gilbody 2019).

Perceived benefits

Improvements in general physical health, fitness, and body image and the psychological benefits of improved sleep, stress reduction, mood management, and increased self-confidence have been identified as perceived benefits (Firth 2016). Positive feelings associated with a sense of achievement, the acquisition of new skills, and developing mastery have also been cited in the literature (Carless 2008; Hodgson 2011; Wynanden 2012).

Perceived barriers

Many of the qualitative studies that consider the perceived barriers to engaging in physical activity cover intrinsic mechanisms that hinder involvement. These include low motivation or energy levels, which can often be symptomatic of an illness (Cole 2010; Firth 2016), or sometimes a side effect of a particular medication or other health characteristics including high body mass index (BMI) or cigarette use (Osborn 2007). Psychological factors including embarrassment, poor perception of self, and guilt can also have a negative impact (Glowacki 2017), as well as general anxiety for social reasons, lack of experience, or perceived lack of ability or poor body image (Cole 2010; Firth 2016). Some studies also consider the counter effects of exercise participation, and, where people do not successfully initiate or maintain an exercise activity, this can have negative impact on their self-esteem (Searle 2012). Patient expectations of the impact of raised activity levels may also need to be managed (Jones 2005). Exercise may not have the desired effects for everyone. Some studies have highlighted the potentially harmful risks for people with bipolar disorder during a manic episode (Wright 2012). Other issues to consider relate to practical difficulties including navigating public transport, high cost, and having no one to accompany them (Wynanden 2012).

Cues to action

Cues to action, such as having appropriate social support systems in place, can help encourage people to become more active and can also have benefits beyond the intervention setting (Carless 2008); they can help tackle participants' motivation and anxiety that may have prevented them from engaging in the past. This can be achieved over the phone, or by other means such as telemonitoring, as well as through face-to-face contact (Argent 2018; Crone 2008; Searle 2014). Having someone to help familiarise participants with the setting and activities at the start of a programme can also be of great value (Firth 2016). Having peer support systems in place can help people engage (Firth 2016), and programmes that promote physical health, fitness, and body image outcomes can motivate involvement (Firth 2016).

Self-efficacy

Higher levels of self-efficacy are evident in those who are already physically active or involved in sport, and these people more likely to benefit (Dishman 1985), as will people who have higher levels of self-esteem, perceived physical condition, and body attractiveness.

OBJECTIVES

To identify the factors that influence participation in physical activity for people diagnosed with bipolar disorder from the perspectives of service users, carers, service providers, and practitioners to help inform the design and implementation of interventions that promote physical activity.

METHODS

We used standard Cochrane methods.

Criteria for considering studies for this review

Types of studies

We included primary studies that used qualitative designs, such as ethnography, phenomenology, case studies, grounded theory studies, and qualitative process evaluations. We included studies that used both qualitative methods for data collection (e.g. focus group discussions, individual interviews, observation, diaries, and document analysis) and qualitative methods for data analysis (e.g. thematic analysis, framework analysis, grounded theory). We excluded studies that collected data using qualitative methods but did not analyse these data using qualitative analysis methods (e.g. open-ended survey questions where the response data are analysed using descriptive statistics only). We considered qualitative data from open-ended questions included in a quantitative questionnaire survey for inclusion. We included studies irrespective of their publication status and language of publication. We also included mixed-methods studies where qualitative findings could be extracted separately.

We did not exclude any studies based on our assessment of methodological limitations, but utilised this information to assess our confidence in the synthesis findings.

We used the Population, Interest, Context (PICo) criteria for selecting studies.

Types of participants

We included studies where the primary focus was the experience of people with a primary clinical diagnosis of bipolar affective disorder (*Diagnostic and Statistical Manual of Mental Disorders, 5th Edition* (*DSM-5*) (APA 2013)/*International Statistical Classification of Diseases and Related Health Problems, 10th Revision* (*ICD-10*) (WHO 1992)), their carers, service providers, and associated health professionals.

We excluded mental health conditions that did not have a clinical diagnosis and age-related conditions (i.e. conditions or diseases that increase in incidence/prevalence with ageing such as dementia). We included participants with other comorbid conditions, such as cardiovascular disease, stroke, and diabetes or other mental health conditions as long as there was a primary diagnosis of bipolar disorder. Participants could be service users, paid (care assistants, home helpers) or unpaid carers (including family members, friends), service providers (e.g. voluntary and community sector organisations delivering mental health services), and healthcare professionals (e.g. social workers, general practitioners (GPs), community mental health nurses, occupational therapists, physiotherapists, key workers, consultant psychiatrists).

Topic of interest

We included studies that focused on the experiences and attitudes of service users, caregivers, service providers, and healthcare professionals towards physical activity for bipolar disorder. We looked for evidence of the factors that created barriers or facilitated participation in physical activity. We included all approaches to increasing physical activity, supervised or unsupervised, in individual or group settings for people with bipolar disease for physical or mental health benefits. We did not include yoga, tai chi, and other mind-body interventions because although these involved physical activity, the therapeutic benefits were theoretically derived from components of the intervention distinct from the physical activity itself.

Type of context

We included studies in any setting including hospitals, private providers, and self-led activity. We included studies in any geographical or political setting or healthcare system (e.g. state-funded or private health care).

Search methods for identification of studies

Electronic searches

The Cochrane Common Mental Disorders Group Information Specialist developed the search strategies for each database in consultation with the review authors and used guidelines developed by the Cochrane Qualitative Research Methods Group for searching qualitative evidence (Harris 2018). We did not apply any search restrictions on date, language, or publication status. Due to the complexity of the search for this review, the nature of the intervention, and the study design (qualitative), we did not search the international trials registers.

(i) Preliminary searches

We developed search terms for the intervention using an initial search of the following databases using Ovid multi-file search (run 15 May 2020):

- Ovid MEDLINE (All) (1946 to 15 May 2020) (Appendix 1);
- Ovid PsycINFO (1806 to May Week 2 2020).

The preliminary searches were based on population (bipolar disorder) combined with broad top-level terms for the intervention (barriers/facilitators) or a sensitive list of terms for outcome (physical activity).

Two review authors (CMcC, JY) screened the search results to identify relevant primary studies and reviews (quantitative and qualitative). They screened the bibliographic records to identify title words, author assigned keywords, key phrases, search strings, and subject headings for the intervention. We used these terms to enrich and refine the remaining searches (and amended the preliminary MEDLINE/PsycINFO searches as appropriate).

(ii) Main searches

The MEDLINE strategy was evaluated and revised in the scoping work as detailed in the study protocol (McCartan 2020). This revised strategy and translation to other databases are presented in Appendix 2. We conducted additional searches of the following databases on 21 March 2021.

- **Cochrane Central Register of Controlled Trials** (CENTRAL; 2021, Issue 3) in the Cochrane Library (searched 21 March 2021)
- **Cochrane Database of Systematic Reviews** (CDSR; 2021, Issue 3) in the Cochrane Library (searched 21 March 2021)
- **MEDLINE** (All) Ovid (1946 to 19 March 2021)
- **Embase** Ovid (1974 to 19 March 2021)
- **PsycINFO** Ovid (1806 to March Week 3 2021)
- **CINAHL (Cumulative Index to Nursing and Allied Health Literature)** EBSCOhost (1982 to 19 March 2021)
- **Science Citation Index (SCI-Expanded)** Web of Science, Clarivate (1900 to 21 March 2021)
- **Social Science Citation Index (SSCI)** Web of Science, Clarivate (1956 to 21 March 2021)
- **Social Policy and Practice** Ovid (1981 to January 2021, searched 21 March 2021)

Due to the large Embase search yield and because the team did not expect to find any studies unique to the Embase search, the Information Specialist amended the Embase search to address specificity.

(iii) Searching other resources

We contacted authors of the included studies to clarify reported published information and to seek unpublished results/data. We contacted researchers with expertise relevant to the synthesis topic for potentially relevant studies.

After completion of study screening and selection, we performed forward and backward citation searching. We checked the reference lists of all included studies and relevant systematic reviews to identify additional studies missed from the original electronic searches (e.g. unpublished or in-press citations). We used the Web of Science and Google Scholar to conduct forward citation searching. We also performed cluster searching (Booth 2013), and used PubMed's related references feature to search for similar articles to the included studies.

(iv) Grey literature

We conducted a grey literature search to identify studies not indexed in the databases listed above on 10 June 2022.

- Open Grey
- ProQuest Dissertations & Theses Global
- DART-Europe E-theses Portal (www.dart-europe.eu/)
- EThOS - the British Library's E-Theses Online Service (ethos.bl.uk/)
- Open Access Theses and Dissertations (oatd.org)

Stakeholder involvement

Stakeholders were involved before, during, and after the review. We drew on the expertise of an advisory group of people with lived experience and professionals working in the area, who were involved in the problem framing stage and were consulted to expand the search to include grey literature, relevant websites, and knowledge of programmes that have been delivered. Engagement with stakeholders during the analysis stage was co-ordinated by two review authors (CMcC and GD), and facilitated by one review author (CW), an expert by experience. Once coding had been completed and the potential themes had been developed using the thematic analysis approach described by Thomas 2008, a workshop was held with service users in order to discuss and review the themes and consider the definitions and names of themes in accordance with the steps in this approach. Feedback and guidance from stakeholders was used to confirm the final themes for the synthesis.

Data management, analysis and synthesis

Selection of studies

Records identified from different sources were imported into EndNote and duplicates removed (EndNote 2019). The results were uploaded to the Covidence online platform to manage screening and data extraction (Covidence). Two review authors from a team of seven (GB, PB, GD, CMcC, MT, PW, JY) independently screened the titles and abstracts of the retrieved records for their eligibility. We retrieved the full text of all papers identified as potentially relevant by one or both review authors. Two review authors independently assessed the full-text papers for inclusion in the review. We resolved any disagreements via discussion or by seeking a third review author's opinion (GB, PB, GD, CMcC, MT, PW, JY) when required. We contacted the study authors for further information as needed.

We included a table listing the studies excluded from our synthesis at the full-text stage and the main reasons for their exclusion (Characteristics of excluded studies).

Where the same study, using the same sample and methods, was presented in different reports, we collated these reports so that each study, rather than each report, was the unit of interest in the review.

We included a PRISMA flow diagram illustrating our search results and the process of study screening and selection (Figure 2).

Figure 2. Study flow diagram.

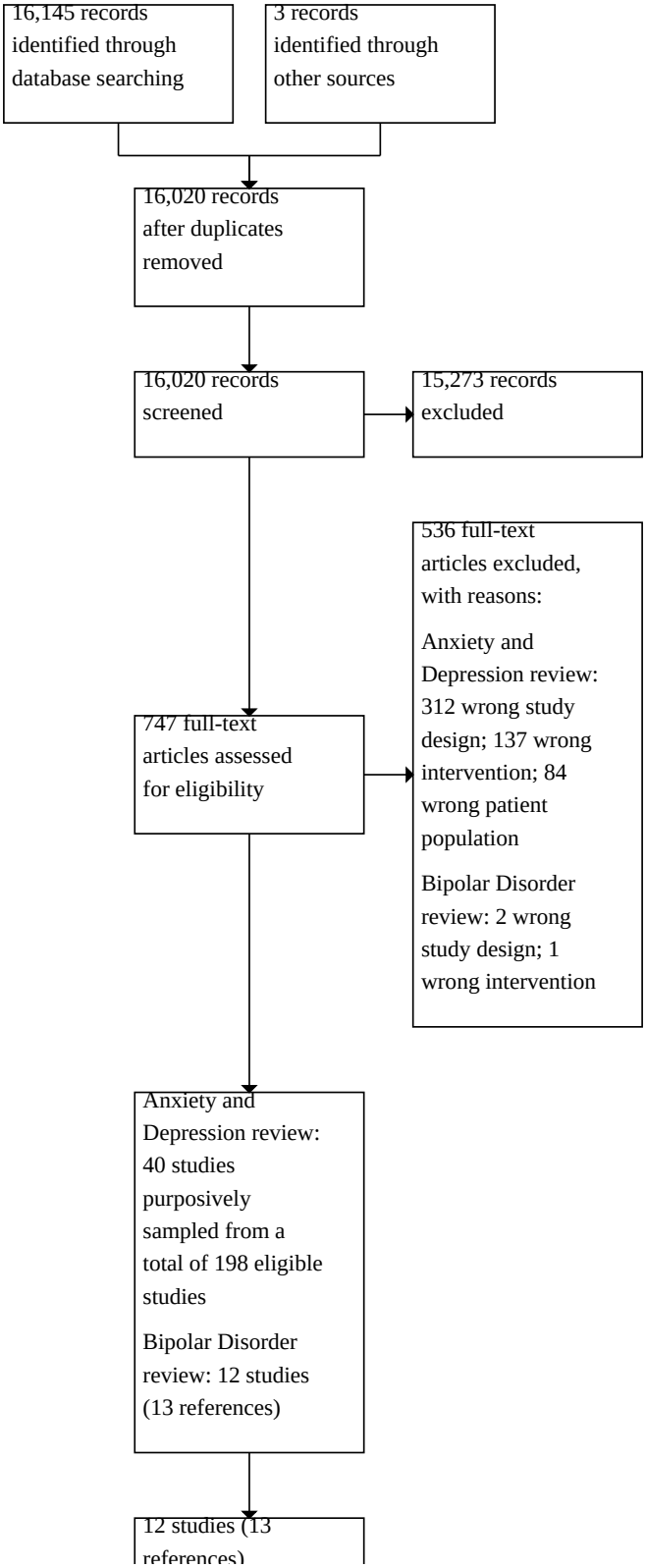
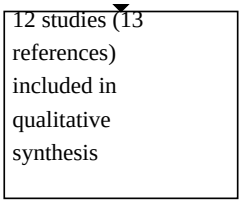


Figure 2. (Continued)



Translation of languages other than English

For papers not published in a language understood by the review authors (i.e. other than Dutch, English, French, German, Italian, Portuguese, Spanish), the abstract was subject to initial translation through open source software (Google Translate). If this indicated inclusion, or if the translation was inadequate to make a decision, we asked members of the multilingual networks associated with the research team to translate the full text.

Sampling of studies

Although we had planned to use a purposive sampling approach if more than 40 studies were eligible for inclusion, due to the relatively low number of included studies, we decided not to select a sample of studies, but to extract data from all included studies.

Data extraction

We used a data extraction form designed specifically for this review (see Appendix 3). Two review authors from a team of four (GD, CMcC, JY, PW) independently extracted data from each included study using the data extraction form in Microsoft Excel (Microsoft 2018). The data extraction template was based on the HMB, which included specific information about: modifying factors (age, gender, socio-economic status, ethnicity, diagnosis, comorbidity, severity or length of condition); perceived seriousness and susceptibility (consideration of future, self-identity, perceived importance, concern for appearance); threats; expectations; cues to action; and outcomes relating to participation in physical activity. We recorded any theoretical frameworks used to analyse the data. Where additional themes were identified, these were discussed by the review team. We extracted additional contextual and methodological information from the included studies detailing information about the country, study design, setting, population, participants, and a description of the intervention (if delivered) (logic model, number, frequency and duration of sessions). We also recorded methods used to identify and recruit the sample, data collection and analysis, relevant quantitative findings, supporting quotations, conclusions, and any relevant tables, figures or images. We stated in the protocol that we would agree a final a priori framework using the Template for Intervention Description and Replication (TIDieR checklist and guide; Hoffmann 2014); however, this was precluded by the lack of interventions. Any disagreements were resolved by discussion or by consulting a third review author (GB, PB, MT) when necessary.

Assessment of the methodological limitations in included studies

Two or more review authors (GD, CMcC, JY) independently assessed the methodological limitations for each study using the CASP Qualitative Checklist (www.casp-uk.net). For studies where information was unclear or missing from reports, we contacted the study authors for clarification. Any disagreements between review authors were resolved through discussion or by involving a third review author (GB, PB, MT). We assessed methodological limitations according to the following domains.

- Was there a clear statement of the aims of the research?
- Was a qualitative methodology appropriate?
- Was the research design appropriate to address the research aims?
- Was the recruitment strategy appropriate to the research aims?
- Was the data collected in a way that addressed the research issue?
- Has the relationship between researcher and participants been adequately considered?
- Have ethical issues been taken into consideration?
- Was the data analysis sufficiently rigorous?
- Is there a clear statement of findings?
- How valuable is the research?

We reported our assessment of methodological limitations for each study in Characteristics of included studies and Table 1. One study reported findings from open-ended responses in a questionnaire survey (Murnane 2016); as this was not a qualitative methodology, we applied the CASP Qualitative Checklist to assess the method of qualitative analysis used to analyse the qualitative free text data only. For this reason, the CASP assessment for this single study is reported separately in Table 2.

Data synthesis

We used an adapted version of the HBM as a basis for a 'best fit' framework synthesis (BFFS) approach to analyse and synthesise qualitative evidence (Figure 1) (Booth 2015; Booth 2016; Carroll 2013). We tailored the theoretical model to develop a 'best fit' theory (Noyes 2015). The HBM provided a basis for the synthesis but was "built-upon, expanded upon, reduced or added to by these new data" as described by Carroll 2011 (p. 4). Data were coded using the HBM; studies were coded into pre-existing concepts, and new concepts were created where necessary. Where any relevant data did not translate into the pre-existing constructs of the HBM, a method was needed to capture these data. Two review authors (GD, CMcC) used the first two steps of the process described by Thomas 2008, employing line-by-line coding to identify new codes where necessary. Differences and similarities were grouped together and used to develop the descriptive themes. Each code was categorised into themes using supporting evidence and quotes to support each theme. Data extraction and categorisation or coding of data

were discussed and agreed upon by the team at regular intervals. Themes were discussed, agreed upon, and then presented to the wider team and the lived-experience group for confirmation and verification. As a result of discussion, themes were refined and renamed and finally written with a description of the theme with accompanying evidence cited to support each finding. The revised HBM model was developed building on the original framework, informed by the additional thematic analysis. We developed a summary of findings table from the synthesised findings once data extraction and analyses had been completed (Summary of findings 1).

Assessment of confidence in the synthesis findings

We used the CERQual (Confidence in the Evidence from Reviews of Qualitative research) (Lewin 2018), assessing our confidence in the review findings based on the following four concepts (Lewin 2018).

1. **Methodological limitations of the included studies**: the extent to which there are concerns about the design or conduct of the primary studies that contributed evidence to an individual review finding. Confidence in a finding may be lowered by substantial methodological limitations.
2. **Coherence of the review finding**: an assessment of how clear and cogent the fit is between the data from the primary studies and the review finding that synthesises the data. 'Cogent' refers to a well-supported or compelling fit. Variations in data across the included studies without convincing and cogent explanations may lower the confidence in a review finding.
3. **Adequacy of the data contributing to a review finding**: an overall determination of the degree of richness and quantity of data supporting a review finding. Confidence in a finding may be lowered if a finding is supported by results from only one or a few of the included studies, or when the data supporting a finding are very thin.
4. **Relevance of the included studies to the review question**: the extent to which the body of evidence from the primary studies supporting a review finding is applicable to the context (perspective or population, phenomenon of interest, setting) specified in the review question. Confidence in a finding may be lowered when contextual issues in a primary study used to support a review finding are different to the context of the review question.

After assessing each of the four components, we made a judgement about the overall confidence in the evidence supporting the review finding. We judged confidence as high, moderate, low, or very low. The final assessment was based on consensus among review authors. All findings started as high confidence and were downgraded if there were important concerns regarding any of the CERQual components.

We presented summaries of the findings and our assessments of confidence in these findings in Summary of findings 1. We presented detailed descriptions of our confidence assessment of the body of data supporting each review finding (Appendix 4).

Summary of qualitative findings table

We presented the findings in Summary of findings 1, which includes an assessment of our confidence in the evidence, as well as an explanation of this assessment, based on the GRADE-CERQual approach (Lewin 2018).

Linking the synthesised qualitative findings to a Cochrane intervention review

There are no current Cochrane reviews on the effectiveness of physical activity for bipolar disorder.

Review author reflexivity

The review team represent a diverse range of professional backgrounds and disciplines with a range of different research experience and expertise that could have biased their contribution to the review. Authors were deliberately recruited to join the review team to provide a wide range of representation and perspectives, including mental health social work (PB, GD, CMcC), physical activity research/sports psychology (GB, JF, MT), psychiatry (SG), mental health promotion and policy (JB, JY), service provision (PW), and lived experience (CW). In addition, the review team comprised authors with considerable systematic review and methodological experience (RC, JF, SG, CMcC) and well-experienced qualitative researchers (PB, GB, GD, CMcC, MT). This provided a good platform for engaging and understanding the complexities and nuances of qualitative research relevant to the topic area.

Screening at the abstract/title and full-text stages was used to discuss and explore decision-making where disagreements or conflicts arose. This provided the opportunity to engage with different perspectives and discipline areas to help reach joint decisions, but also provided a robust approach to challenge bias. The body of the coding, data extraction and synthesis was undertaken by two review authors (GD, CMcC), representing both practice perspective and evidence synthesis experience. Regular meetings were co-ordinated to encourage reflexive joint decision-making when developing codes, themes and synthesising the data. Additional team members were consulted where required (GB, MT, CW, JY) to verify the findings on the basis of the supporting data. This led to discussion and questioning of personal biases as a group, which helped increase our confidence in the findings. Engaging with stakeholders and service users also provided an additional step of challenging potential bias in our recommended findings and helped reframe the findings in a more accessible way. Lived-experience contributions also helped to reinforce our findings and conclusions, particularly in making recommendations for policy and practice.

RESULTS

Description of studies

Results of the search

We identified a total of 16,020 references, of which 747 papers appeared to meet the inclusion criteria for this review and a related review on anxiety and depression (McCartan 2020). We excluded 536 references based on full-text review, of which 3 were related to the current bipolar review (1 wrong study design and 2 wrong intervention) and 533 were related to the anxiety and depression review. We included 12 studies (13 papers) in the synthesis, which involved a total of 592 participants (422 participants who contributed qualitative data to an online survey, 170 from qualitative studies; see Characteristics of included studies). The included studies were published between 2008 and 2022, and all were published in English.

Included studies

Study design

Three studies presented individual case studies of lifestyle interventions. Two of these were described by clinicians (Bueno-Antequera 2018; Filia 2012), while the third case study presented the experience of initiating lifestyle changes from a lived-experience perspective (Hensley 2008). Semi-structured interviews conducted face-to-face or over the phone were used to collect data in five studies (Chalmers 2020; Eden 2022; McCullough 2021; Pereira 2019; Wright 2012), and two studies used both interviews and focus groups in their design (Bauer 2018; Suto 2010). Switsers 2018 collected data using focus groups, and Murnane 2016 used an online survey that included open-ended responses constituting three quarters of the total sample (76.5%); these were included in our synthesis.

Study focus

Three studies delivered multicomponent psychosocial interventions designed to increase healthy lifestyle behaviours (e.g. smoking cessation, food and nutrition) including the promotion of physical activity (Bueno-Antequera 2018; Filia 2012; Hensley 2008). Four studies examined people's experiences of exercise and bipolar disorder (Eden 2022; McCullough 2021; Pereira 2019; Wright 2012). Three studies explored self-management strategies employed by individuals with bipolar disorder to manage symptoms, which included physical activity (Murnane 2016; Suto 2010; Switsers 2018). Bauer 2018 used a focus group and interviews to consider the design of an optimal lifestyle intervention.

Study countries

Most studies were based in high-income countries (three in the USA (Bauer 2018; Hensley 2008; Murnane 2016), four in the UK (Chalmers 2020; Eden 2022; McCullough 2021; Wright 2012), one in Australia (Filia 2012), one in Canada (Suto 2010), one in Belgium (Switsers 2018) and one in Spain (Bueno-Antequera 2018)). Brazil was the only middle-income country, represented in one study (Pereira 2019).

Study setting and participants

Most studies were sited within the community, community mental health, or outpatient settings. The majority of participants were recruited via flyers or advertisements, or through online bipolar/depression charities/communities/websites and patient networks (Bauer 2018; Chalmers 2020; Eden 2022; Murnane 2016; Suto 2010; Switsers 2018; Wright 2012). Three studies also recruited service users through clinical services (Bauer 2018; Chalmers 2020; Pereira 2019). The PhD research of Chalmers 2020 included interviews with family carers (recruited through the charity Bipolar Scotland and through social media) and health professionals working in the National Health Service (NHS) in the UK. McCullough 2021 accessed research participants through the Bipolar Disorder Research Network participant database (www.bdrn.org). All studies required that participants be clinically stable to take part.

The majority of participants were female; the three case studies were all women, and five studies reported samples that comprised at least 60% female (Bauer 2018; Eden 2022; McCullough 2021; Pereira 2019; Suto 2010; Wright 2012). The online survey conducted by Murnane 2016 had the largest number of female participants (84%). Suto 2010 conducted additional purposive sampling to increase the number of male respondents. The average age (where reported) was 42.75 years, with participants ranging in age from 18 to 74 years. Sample sizes varied from single-case studies (Bueno-Antequera 2018; Filia 2012; Hensley 2008), to 442 respondents to an online survey (Murnane 2016).

Five studies described socio-economic status (Bauer 2018; Chalmers 2020; Hensley 2008; Pereira 2019; Switsers 2018). Of the 10 participants in Bauer 2018, 4 were employed on a full-time basis. Chalmers 2020 mapped people's home address postcode to the multiple deprivation index; 38% of respondents lived in the most deprived quintile, and 19% in the least deprived. Hensley 2008 described herself as unfit to work, and the participants in Pereira 2019 were on a low household income (ranging from BRL 723 to 5000 per month): 4 were students, 5 were employed, 13 were in receipt of disability benefits, and 1 was retired. Two of the 16 participants in Switsers 2018 were employed. Three studies reported ethnicity. The participants in Bauer 2018 were African American (60%), Caucasian (understood to be white) (30%), and Hispanic (10%). The sample in Eden 2022 was white British (75%), other white (20%), and mixed multiple ethnicity (5%). In McCullough 2021, the majority of participants reported their ethnicity as "UK White". Funding sources and declarations of interest are reported in Characteristics of included studies.

Methodological limitations of the studies

Most studies described the context, participants, sampling, methods and analysis. However, there was poor or no reporting of researcher reflexivity across all studies. Three studies described case studies, but these provided thin data without in-depth analysis of the issues. Most of the other studies used focus groups or interviews, which generated much more useful data, and we considered these methodological approaches more suitable. We also considered open-ended responses to an online survey to be methodologically adequate, while acknowledging common sampling and response biases associated with online surveys (e.g. self-selection, technologically adept respondents). Only one study sought the views of family members or health professionals, which is reflected in our assessments (Chalmers 2020). There was considerable heterogeneity in the included studies: one study reported on 442 participants, constituting almost 80% of the total QES population (Murnane 2016), and three studies represented the experience of single case studies (Bueno-Antequera 2018; Filia 2012; Hensley 2008). While we set out to examine the modifying factors identified by the HBM including gender, race, and socio-economic status, these elements were not included in the reporting of the analysis. These factors were reported inconsistently or not at all, making it difficult to attempt any exploration or nuanced understanding of these factors. The majority of the sample were female, and all participants were 'psychologically ready' and stable to engage in treatment. Furthermore, recording of socio-economic status was not recorded uniformly, and it was decided that cross-comparisons could not be made. Only three studies reported ethnicity.

Confidence in the review findings

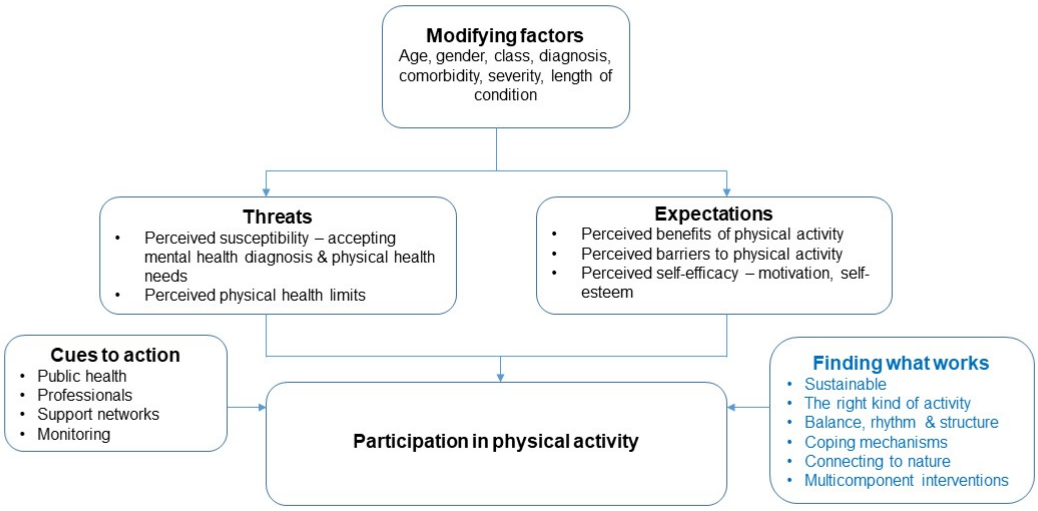
Using the GRADE-CERQual approach, we assessed 13 findings as high confidence, 6 as moderate, and 1 as low confidence. Our main concerns were related to the adequacy of the data. We were concerned about data adequacy for several findings because the supporting data were thin or from only a small number of studies,

and although data were included from some men, the majority of participants were women. Samples were mostly from high-income settings, with little evidence of different ethnic groups. Our explanation of the GRADE-CERQual assessment for each review finding is shown in the evidence profiles (see Appendix 4).

Review findings

We used the HBM as a template to code the evidence from the included studies, leading to the identification of 15 review findings, under 3 of the domains contained within the HBM model. At least ≥ 50% of the data could be applied to the framework, and the HBM was considered an adequate scaffold for the best-fit framework synthesis. One additional domain was created that did not fall within the HBM framework to reflect five other themes emerging from the data (see Figure 3 for amended model). The higher-level concepts developed by Orji 2012 were not well-supported by the evidence; however, the broader concepts of 'Threats', 'Expectations', and 'Cues to Action' were well-supported, and each review finding was explored in greater depth under these three domains, with the addition of a fourth domain ('Finding what Works') identified from the data.

Figure 3. Amended Health Belief Model.



Summaries of each finding and their GRADE-CERQual assessment are available in Summary of findings 1.

Theme 1. HBM Domain 1 - Threats: Perceived susceptibility - accepting mental health diagnosis, physical health needs, and perceptions of physical health limits

Being psychologically ready to engage in physical activity was important. Being clinically stable was considered an important element of being 'ready' to engage in lifestyle/physical activity interventions from the perspectives of men and women with bipolar disorder and healthcare professionals. This also referred to having accepted and 'come to terms' with their bipolar disorder diagnosis. Being ready to improve their physical health and appearance also motivated participants to adopt changes. Having strategies in place to prevent relapse was also potentially beneficial. This raised the issue that the men and women involved in the included studies were 'ready'; more research is required in populations where they do not wish or feel the need to participate in physical activity interventions.

Physical health needs of men and women with bipolar disorder were often neglected despite their increased risk of cardiovascular disease, diabetes, and obesity and higher prevalence of associated health risk behaviours. People reported that the routine assessment of their mental health often did not include physical health measures, despite recognising the importance of monitoring and treating one's physical health needs alongside their mental health problems. Poor mental health may have impacted people's capacity to initiate or adhere to treatment guidelines. Men and women with bipolar disorder sometimes had difficulty accessing primary care, and some mental health settings reinforced negative health behaviours. The neglect of the physical health of people with mental health problems has been well documented, and further messaging is required to support people with bipolar disorder to identify and understand their physical health needs and strategies to improve health outcomes and improve quality of life. This extends to healthy eating, the impact of medication, and managing the physical demands/limits that can be characteristic of bipolar disorder and its treatment.

High rates of smoking remain prevalent in bipolar disorder, and approaches to stopping smoking could have an impact on bipolar medication and contribute to weight gain. While weight gain can be a motivation to being more active, it could also make it difficult

to see results quickly. Gender differences such as increased health risks and a higher risk of weight gain in women require gender-sensitive approaches to lifestyle intervention design. Identifying negative triggers that can lead to setbacks was also highlighted as important.

Finding 1: Being psychologically ready to engage in physical activity is important (high confidence).

It was acknowledged that people had to be ready to engage in adopting lifestyle changes (Bauer 2018; Bueno-Antequera 2018; Chalmers 2020; Filia 2012; Hensley 2008; Murnane 2016; Pereira 2019; Wright 2012), and that their participation was voluntary (Bueno-Antequera 2018). Male and female participants in Bauer 2018 agreed that having come to terms with their diagnosis was a pre-condition for an intervention to work, but the timing of the intervention also had a better chance of being effective *"when employed during less severe states of depression or hypomania"* (Wright 2012, p. 641). Any planning for the introduction of lifestyle changes would require some relapse prevention strategies to be in place before initiating change (Bauer 2018). Finding the easiest place to start and taking steps at a modest pace may also facilitate readiness (Chalmers 2020; Hensley 2008). In Chalmer's PhD study, "one health professional felt it was better to start with small tasks rather than to put people off by setting more intimidating targets like attending a gym",

"*I think just introducing them to the idea of a different activity, 'cause then people will start thinking, 'Oh, I need to lose weight. I'll need to go to the gym.' And that word just puts people off. Whereas actually there's other things that can be done, like just simple walking, to promote a bit of activity.*" (Clinician ID2 Chalmers 2020, p. 181-2). The same clinician also identified risks associated with people feeling overwhelmed, *"I think the barriers are likely to have been his mood, likely to have been the thought of 'This is a big mountain to climb, and I can't do it', and just feeling a bit overwhelmed by it."* (Clinician, ID 2 in Chalmers 2020, p. 159).

In Hensley 2008, the author describes her doctor's reinforcement of 'being ready', *"'Let's worry about that when you feel better'"* (physician in Hensley 2008, p. 247). Being ready was prompted by her motivation for change, "*I grew tired of my sedentary lifestyle. I was tired, too, of having to buy two seats to fly on an airplane; tired of being reminded of my many risk factors for metabolic syndrome; tired of having to wear shapeless clothes to cover my oversized body; tired of feeling bad about myself.*" (Hensley 2008, p. 247).

One drawback of this evidence is that research has been conducted with people wanting to make changes, and there are many others who may not be stable or ready to engage (Bauer 2018).

Finding 2. The physical health needs of men and women with bipolar disorder are often not appropriately assessed and addressed. It is important to promote people's understanding of their physical health needs (moderate confidence).

This issue was highlighted in a number of studies (Bauer 2018; Filia 2012; Pereira 2019), and reinforced in conversation with people with lived experience. We know that people with severe and enduring mental health problems are less likely to receive health screening and physical health care. Both male and female participants often had poor knowledge of the benefits of healthy eating and exercise (Bauer 2018; Filia 2012; Pereira 2019), *"No, never. Nobody suggested I do it. It is the first time I heard about if for bipolar disorder"* (E4 in Pereira 2019, p. 4). *"The physical health needs of people with mental illness are often neglected, meaning that behavioral and biomedical risk factors for CVD are not routinely assessed or assertively treated in this population."* (Filia 2012, p. 290).

Both men and women in the included studies often had a range of comorbid conditions that elevated their physical health risks. Common conditions included smoking, obesity, diabetes, hypertension, high cholesterol, persistent pain (Bueno-Antequera 2018; Chalmers 2020; Filia 2012; Pereira 2019), but these comorbidities were considered the disabling factor rather than being bipolar, *"patients generally did not attribute their greatest difficulties to the practice of exercise to the disease itself, but rather the disability that accompanies it"* (Pereira 2019, p. 6). These health problems impacted on their ability to take part in physical activity, "*I haven't been going to the gym as much 'cause I had problems wi' my leg last year. It's my Achilles' heel actually*" (Female, 57, obese BMI in Chalmers 2020, p. 135).

Finding 3. People identified the influence of other factors that affected physical activity levels; this included high prevalence rates of comorbid health risks and negative triggers that could lead to setbacks. There are gender differences that require consideration in lifestyle intervention design, such as greater risks associated with smoking in women requiring a gender-sensitive approach (moderate confidence).

Alcohol use, obesity, smoking, and the impact of medication were all identified as barriers to engaging in physical activity (Bueno-Antequera 2018; Chalmers 2020; Filia 2012; Hensley 2008; Pereira 2019). With the high rates of smoking in the bipolar disorder population, smoking cessation/reduction treatment can interact with psychiatric medication, slowing metabolism and leading to weight gain, especially in women (Filia 2012), *"smoking was associated with greater symptom and episode severity, rapid cycling, more lifetime and manic episodes, comorbid psychiatric disorders, being currently symptomatic, greater alcohol and illicit substance use, and a history of suicide attempts*." (Filia 2012, p. 291).

The health risks for smoking in women are statistically greater, requiring the need for smoking cessation interventions to be gender-sensitive (Filia 2012). Bipolar medication was also associated with weight gain in five studies (Bueno-Antequera 2018; Chalmers 2020; Filia 2012; Hensley 2008; Pereira 2019), "*The antipsychotic medication in particular made me ravenous; there was no end to my hunger*" (Hensley 2008, p. 247), "*when I first went on lithium my weight shot up about two stone in about three months. Something like that, approximately*" (Female, 55, normal BMI in Chalmers 2020, p. 125).

Physical comorbidities, high rates of obesity, cardiovascular disease, diabetes, and poor baseline fitness levels may also affect the motivation or capacity to exercise (Pereira 2019). Feeling lethargic was also identified as a common side effect (Bueno-Antequera 2018; Chalmers 2020).

Theme 2. HBM Domain 2 - Expectations: Perceived barriers to, and benefits of, physical activity and perceptions about self-efficacy, motivation, and self-esteem

People felt shame and stigma associated with the psychological and physiological aspects of bipolar disorder. This presented in a

variety of ways, including anxiety, embarrassment, and negative coping skills such as social isolation being used as a form of self-protection. Strategies to combat societal and self-stigma were central to encouraging people with bipolar disorder to access interventions.

Mental illness can have a considerable impact on the economic well-being of individuals and families, and financial constraints were identified as a barrier to engaging in both physical activity and implementing other healthy behaviours. Costs associated with equipment, clothing, or access to exercise settings were raised as issues, as well as spending becoming out of control when unwell. Whether health insurance or employment perks covered exercise costs was a consideration. Low-cost exercise options such as walking were valued. Providing financial incentives for participating in exercise schemes was also raised.

Practical issues presented problems for some people, and approaches to providing safe, accessible, and appropriate settings to promote physical activity were considered important. Barriers such as poor weather and transport were more difficult to tackle; however, changes suggested to create more opportunities to be active within clinical settings was considered an important element of reducing the amount of sedentary time.

There were a number of positive benefits of being physically active for people with bipolar disorder. There was evidence that being active could help with mood regulation and related negative symptoms if managed appropriately. People also reported a broader impact on their quality of life, such as connecting with others, feeling a sense of achievement, and physical health benefits including weight loss and improved cardiovascular health. Incorporating physical activity into a regular routine also contributed to new routines and habits that promoted well-being such as improved sleep, healthy eating, and reducing negative coping strategies.

Individuals described themselves as being active or having lost all mastery of sport and exercise they once had in their childhood/youth. While physical activity recommendations were mandatory in education settings up to a certain age, once leaving school people were often not well-supported to maintain healthy physical activity habits into lifelong healthy behaviours. Individuals reported different views about their physical activity or 'sporting' identity. There were multiple narratives and reflections on active childhoods and adolescence and an active identity that had been (a) maintained or (b) lost in adulthood.

Taking responsibility for participating in physical activity was important, potentially improving recovery. This included being able to monitor and respond to changes in moods and symptoms and knowing when and where to seek support, whether this was self-led or available from other sources (e.g. professionals). This corresponds to ‘being ready’. Helpful support could be provided in the form of feedback to help set and track goals and build self-confidence. An element of self-care and being less critical was also raised as a consideration.

Finding 4: Stigma and shame related to bipolar disorder and physical activity needs to be tackled (high confidence).

Previous experiences and negative perceptions of 'self' relating to physical appearance or their bipolar diagnosis, or both, influenced men's and women's participation in physical activity. Avoiding public exercise spaces such as gyms was described in three studies (Filia 2012; Hensley 2008; Pereira 2019). Exercising in public could be a source of anxiety and invoked feelings of shame about their overweight body, low self-esteem, and the fear of being identified as someone with a mental health problem, *“To start with I’m ashamed to go to the gym, I do not like it […] I do not like to expose myself. I do not like to be looked at too much, I get upset. Usually you go to these places, you're cute and you have friends, you are not an old fat lady, so I avoid it.”* (E4 in Pereira 2019, p. 5).

A lack of understanding about mental health within society also invoked feelings of shame and stigma, which in turn discouraged men and women from implementing lifestyle changes (Bauer 2018; Hensley 2008; Pereira 2019), *“I resisted exercise. I joined a gym for a while at the urging of my physician, but working out in front of other people made me anxious, so I quit.”* (Hensley 2008, p. 247).

Social isolation was described as a protection strategy from feeling the impact of shame and stigma, with individuals isolating themselves from public settings, *"these people are uncomfortable to attend different social places, and are afraid to show any symptoms of the disease and thus be identified and labelled as people with some mental problem. Therefore, they anticipate rejection and, to avoid embarrassment, many develop social isolation as a protection strategy.”* (Pereira 2019, p. 6).

'Safe' spaces for men and women to undertake supervised physical activity were increasingly being made available within community settings, but more opportunities to provide non-stigmatising environments that could be used to develop new skills and experiences of exercise could be beneficial. Tracking technologies may help reduce stigma (Filia 2012; Hensley 2008; Murnane 2016; Pereira 2019).

Finding 5: There are financial constraints associated with engaging in physical activity (high confidence).

The costs associated with a healthy lifestyle were raised across a number of studies, highlighting a range of different economic decisions that could influence physical activity, including the cost of healthy eating (Bauer 2018), the cost of gym membership (Bauer 2018; Chalmers 2020; Suto 2010), and buying appropriate clothing (Pereira 2019), *“Financial constraints were identified as a core factor affecting health life choices (e.g. gym membership, price for fish versus pasta.”* (Bauer 2018, p. 558).

Socioeconomic status could compound difficulties in undertaking physical activity, including the financial precariousness of both men and women (Bauer 2018; Pereira 2019; Wright 2012) related to being unemployed or medically unfit to work (Bueno-Antequera 2018; Pereira 2019), as a result of symptomatic excessive spending during hypomanic episodes (Murnane 2016; Switsers 2018), or feeling unsafe to exercise outdoors in deprived, high-crime neighbourhoods (Pereira 2019).

Positive approaches to addressing financial constraints were referenced in Bauer 2018, Pereira 2019, and Suto 2010. Compensation for participating in intervention programmes encouraged participation, or health insurance that covered the cost of gym membership (Bauer 2018). Suto 2010 also raised the issue of allowances for gym membership through employee benefits schemes, *“The company itself does [affect my health] because they*

do have a fitness allowance and I'm encouraged to take classes. Usually I wouldn't bother going yoga because I'd be like, 'you know it's too expensive' or 'I'd have to buy a mat' or you know, 'they don't reimburse you for the other stuff but the classes itself or there's a gym there' so they're very proactive with all-around wellness." (Suto 2010, p. 79). Chalmers 2020 also reinforced this issue and that paying for gym membership acted as an incentive for going, but this did not work for everyone, especially when mood and motivation were low.

Pereira 2019 conducted their research in a middle-income country, Brazil, and area-level deprivation and personal safety was considered a factor that prevented men and women from exercising outdoors, and schemes that offered safe, local exercise opportunities, targeting lower-income populations, were considered a facilitating factor. Pereira 2019 also emphasised the importance of trying to reduce the clinical and social burden associated with bipolar disorder.

The benefits of walking were mentioned across several studies; this was easy for most people to do, and the low cost was appealing (Pereira 2019).

Finding 6: Practical barriers to regular physical activity include bad weather, lack of access or transport problems, and feeling safe. Creating accessible, low-cost, and safe settings could increase access and help reduce stigma for both men and women (moderate confidence).

Evidence from two studies identified the weather as a potential barrier to undertaking physical activity (Chalmers 2020; Pereira 2019), "*When it is cold it is more difficult to walk in the street*." (E9 in Pereira 2019, p. 5). "*it is more difficult to exercise over the winter*" (Female, 34, normal BMI in Chalmers 2020, p. 135).

Lack of access, whether this related to poor public transport (Bauer 2018); lack of options in the local area (Pereira 2019), *"And where I live there is nothing close available […]. Unfortunately, at least here, there are not many places that you have access to do it."* (E8 in Pereira 2019, p. 5); or more complex perceptions around feeling safe in the neighbourhood impacted activity, *"I confronted my fear of being outdoors and started going for walks around my neighbourhood as well."* (Hensley 2008, p. 248).

Lastly, restrictions in clinical settings were cited by clinicians interviewed in Chalmers 2020, and perspectives from men and women with lived experience also reflected on the limited opportunities when hospitalised to receive care. The problem is that being on a ward can restrict leisure time. *"The biggest barrier here was the restricted environment. People don't have free time ... that makes a big difference on people's recovery, their motivation for recovery, the momentum of the recovery and obviously their kind of impact on fitness levels as well."* (Clinician, ID2 in Chalmers 2020, p. 169). A clinician also highlighted that the restrictions on internet access in work settings impacted on using technology to support healthy behaviours, *"Tonnes [of technology for support]. If they [patients] were allowed on the internet."* (Clinician, ID1 in Chalmers 2020, p. 169).

Finding 7. The positive benefits of physical activity for bipolar disorder include physical health benefits and increased healthy behaviours, mood regulation, and making social connections. Men and women also reported wider benefits for their quality of life such as connecting with others, feeling a sense of achievement, and physical health benefits including weight loss and improved cardiovascular health. Incorporating physical activity into a regular routine also helped establish new routines and habits that promoted well-being such as improved sleep, healthy eating, and reducing negative coping strategies (high confidence).

A range of positive benefits were reported from being physically active, including psychological, physiological, and social (Bueno-Antequera 2018; Chalmers 2020; Eden 2022; Filia 2012; Hensley 2008; Murnane 2016; Pereira 2019; Switsers 2018; Wright 2012).

Seven studies reported weight loss (Bueno-Antequera 2018; Chalmers 2020; Eden 2022; Filia 2012; Hensley 2008; Pereira 2019; Wright 2012), *"[Exercise is] good for losing weight"* (Catherine in Wright 2012, p. 637). *"One of the reasons why I run as well is just to lose a bit of the weight that I picked up with the medication that I was on."* (Eden 2022, no page number). *"I would say I've noticed running does keep the weight off you."* (Female, 34, normal BMI in Chalmers 2020, p. 129). "*and it did do him the world o' good when he went tae the gym, 'cause he lost weight, and he was quite proud …"* (Family, ID7 and 8 in Chalmers 2020, p. 162).

Others felt a sense of achievement, accomplishment, feelings of satisfaction, and improved self-esteem (Bauer 2018; Eden 2022; Pereira 2019), *"Exercise makes me feel better about myself ... you feel like you've achieved something."* (Eden 2022, no page number).

Establishing social connections and reducing isolation was a gain mentioned in four studies (Chalmers 2020; Eden 2022; Murnane 2016; Pereira 2019). Eden's interviews found that people valued the opportunity to connect with others with the added benefit of getting exercise, and it was considered quality time, *"Like it gives you two things the exercise, being outside and connecting with another human being."* (Eden 2022, no page number). In other PhD research, Chalmers found similar experiences, "*'Cause I know it's, you know, it's good for me to get out and about rather than just become isolated in here."* (Female, 57, obese BMI in Chalmers 2020, p. 128).

Indirect positive benefits to people's physical well-being were also reported, including improved sleep (Murnane 2016), healthier eating (Bueno-Antequera 2018), new habits/routines (Hensley 2008), and increased energy levels (Bueno-Antequera 2018; Eden 2022; Filia 2012; Murnane 2016), *"It gives me energy. It makes me feel more, more like being active."* (Eden 2022, no page number). Improvements in overall fitness, blood pressure, cognitive function, diabetes, strength, and appetite were also observed (Chalmers 2020; Pereira 2019; Wright 2012), *"My blood pressure has come down"* (Noel in Wright 2012, p. 637). "*Even like going up stairs and things is a lot easier."* (Female, 56, overweight BMI in Chalmers 2020, p. 128). Bueno-Antequera 2018 reported a reduction in medication and symptom severity in their single-case study.

Improved quality of life was referenced in two studies (Hensley 2008; Pereira 2019), *"regular exercise has improved my moods and getting regular exercise has boosted my quality of life."* (Hensley 2008, p. 248). Mood stability was also considered a positive benefit, with the potential of physical activity helping to regulate mood and reduce intensity in hypomanic/depressive episodes (Murnane 2016; Pereira 2019; Wright 2012), *"If I am hypomanic, exercise calms me down"* (Sharon in Wright 2012, p. 637). *"when you're down it can actually lift it [the mood], you know, even just, even just a little*

bit and that can be enough to just keep things ticking over, and then at the other end [when I'm feeling high] … doing something incredibly sweaty for any period of time, it literally burns off some of the energy" (Callum in Wright 2012, p. 638).

System-level benefits were also identified in Bueno-Antequera 2018 and Pereira 2019 as reductions in healthcare costs.

Finding 8. Perceptions about lack of skill, mastery, or confidence can prevent men and women with bipolar disorder from being active. While physical activity recommendations are often mandatory in education settings up to a certain age, once leaving school, people are not well-supported to maintain healthy physical activity habits into lifelong healthy behaviours. Girls in particular are more likely to give up sport during these transitions (high confidence).

A group of people across the data sources had consistently maintained high levels of activity and self-identified as being active and sporty (Pereira 2019; Wright 2012), *"I've always exercised, always done something"* (Laura in Wright 2012, p. 636). *"I've always been sort of umm, athletically inclined, you know, I've always done things like swimming and badminton and things"* (Nancy in Wright 2012, p. 636). *"I've done the Sunday afternoon walk and the ballroom dancing for many years"* (Tim in Wright 2012, p. 636).

Most people described taking part in physical activity at some point in their lives, and this was mostly attributed to physical education in school (Pereira 2019; Wright 2012). Leaving school can be a turning point for many, particularly young women, and this was reflected in a number of accounts, *"she used to be, she used to do running, and hockey, and all sorts of things at school … but obviously having left school and being a girl of a certain age when it's not … cool to do that in the same way."* (Family member ID10 in Chalmers 2020, p. 170).

A number of the participants had been very active in their youth, competitively so, but work and family life often interfered with the time and capacity to maintain high levels of activity, *"I used to run for my school … Obviously once you leave school and you start work you stop, unless you are very keen on sport"* (Catherine in Wright 2012, p. 636).

This was also reflected in female and male accounts, *"I used to do a lot of exercise when I was younger … a lot of cycling, sort of walking and hill walking and things, and then that kind of, just from about the age of about 20 or so, umm I was working that much the exercise took a back burner"* (Noel in Wright 2012, p. 636).

Almost everyone can identify a time in their lives when they had a 'sporty' or athletic identity, and a number of studies have associated the loss of this identity with emergence into adulthood. This is was spoken about separately from their diagnosis of bipolar disorder and was associated with the introduction of other adult responsibilities, including family and work, where physical activity becomes less of a priority.

While participants had to demonstrate being psychologically ready to participate in physical activity, they also felt they needed to have the skills and confidence to take part. Having mastery or skill in some sort of physical activity could facilitate involvement (Bauer 2018), and without this, both male and female participants did not know how to initiate physical activity (Hensley 2008; Pereira 2019), *"I was thinking about getting more physically fit, but I did not really know how I would go about it"* (Hensley 2008, p. 248).

Lack of confidence was cited as a barrier to tackling a range of health behaviours (e.g. smoking cessation) and was not confined to physical activity (Filia 2012; Pereira 2019). This finding resonated with our experts in lived experience, who reported that the experience of being diagnosed could be physically disabling, *"before I was diagnosed, I used to ..."* (Expert by experience). Chalmers measured BMI, and those with a normal BMI talked about physical activity being an embedded part of their lifestyle; in contrast, those who were overweight or obese spoke about having to take part in physical activity (Chalmers 2020).

Finding 9. Taking personal responsibility for physical activity was important. This included being able to monitor and respond to changes in moods and symptoms and knowing when and where to seek support. This corresponds to 'being ready'. Helpful support could be provided in the form of feedback to help set and track goals and build self-confidence (high confidence).

Accountability and empowering people to take responsibility for being physically active was considered important, and by providing professional support and regular feedback, this could increase the potential for recovery and contribute to well-being (Bauer 2018; Filia 2012; Murnane 2016), "Increasing recovery and empowerment by making free choices, with adequate guidance and feedback" (Bauer 2018, p. 557) and helping to develop "perceptions of agency that they described as instrumental to recovery" (Murnane 2016, p. 480) could ultimately help build autonomy and self-confidence (Pereira 2019).

The theme of accountability included developing new coping mechanisms (Hensley 2008), self-enforcing behavioural consistency (Murnane 2016), being proactive about mood regulation (Eden 2022; Wright 2012), and taking control of self-management, being self-aware, and monitoring in order to stay well (Suto 2010).

Taking the initiative to understand the condition was also highlighted as important, and this could be without the direct involvement of health professionals, but also knowing when to seek help. Murnane 2016 described this and the use of tracking technology as providing a basis for discussing treatment efficacy and ostensibly making patients 'active' in the management of their condition.

During periods where people were unwell, autonomy and power could be reduced, *"For me to go downtown, only if I go with someone, alone I cannot. Then I lost my autonomy and this is bad. Then how could I do a physical activity elsewhere?"* (E21 in Pereira 2019, p. 5). Promoting accountability and personal responsibility could also help empower people to improve their well-being, *"providing opportunities for a favorable environment for the individual to interact, create links and regain their autonomy and self-confidence."* (Pereira 2019, p. 2).

Poor time management, conflicting schedules, and the demands of work or home could impact on time spent being active (Bauer 2018; Pereira 2019; Wright 2012), but the evidence also suggested that how physical activity was prioritised when time was limited ultimately affected participation, *"From the interviewed, it was*

possible to conclude that when patients have free time, other activities were prioritized, causing the premature abandonment of activity." (Pereira 2019, p. 6), and effort had to be made to incorporate it when time was pressured, *"You have got to give time to the activity"* (Alice in Wright 2012, p. 637). In Eden's study, exercise was described as an essential element (Eden 2022).

Theme 3. HBM Domain 3 - Cues to Action: Messaging from public health, professionals, support networks and the role of monitoring

Clearly understanding how to make lifestyle changes helped to develop personal accountability and master physical activity. This included providing regular feedback on progress and providing access to healthcare professionals as a means of staying well. Supporting people to discuss their personal issues and factors, including setting and reviewing goals, could challenge their participation and facilitate engagement.

Understanding bipolar disorder was important for service users and mental and physical health professionals. Having knowledge of the symptoms and the impact of medication and associated comorbidities provided insight into the management and improvement of care. Where knowledge of psychopathology was evident, better outcomes were observed. Different levels of intensity of physical activity could impact on mood, and adjustments were needed to manage this. This was also reflected when physical activity levels dropped or completely stopped and negatively affected mood and motivation. Participants had to monitor and work at healthy lifestyles to maintain and manage wellness. More needs to be learned about those with bipolar disorder not ready or willing to engage in physical activity.

Messaging from professionals tended to concentrate on the benefits of weight loss, but did not promote the potential mental health benefits. Better training and education of health and social care professionals could encourage the promotion of physical activity as beneficial for the management of bipolar disorder. For some participants, physical activity could exacerbate negative symptoms. Physical activity can form part of a successful treatment plan, helping to manage negative symptoms, promoting positive mood, and improving physical health. A range of associated positive outcomes were also reported by people incorporating physical activity as part of their treatment and management of bipolar disorder, including making social connections and accessing nature; being physically active could also have an indirect effect on other healthy behaviours (e.g. improving nutrition, reduction/cessation of smoking and medication). Offering multicomponent interventions was feasible, with sequenced phases that could help tackle a range of lifestyle behaviours incrementally that could negatively impact on a person's health and well-being commonly associated with the symptoms of bipolar disorder (e.g. smoking, nutrition, exercise, sleep).

Trained mental health professionals involved in physical activity interventions helped improve understanding of motivation and encouragement and being visible/available should additional support be required. There was evidence of doctors and GPs promoting physical activity to improve some of the side effects of medication, managing mood and reducing other lifestyle risks (e.g. smoking, nutrition). Multidisciplinary teams that offer support from a range of different professions, including psychology, psychiatry, nutrition, sports medicine, lifestyle coaching, dietetics, and fitness trainers, were considered important to providing effective care and support. Establishing support across other health and social care providers to promote harmonious relations and shared messaging between services could be effective.

Reliance on others was identified as important in encouraging and supporting physical activity and helped individuals to establish and maintain the routine required for regulating and sustaining physical activity, including during periods of low or high mood. The role that friends and family played in providing motivation and opportunity to engage in and enjoy physical activity, and the associated social connections were evident. However, where support was unreliable or absent, a negative and detrimental impact was observed. Support networks, either from existing friends/family or co-ordinated by service providers, could help sustain activity levels.

Mood regulation was an important aspect of managing symptoms of bipolar disorder, and there was a role for monitoring mood, including the use of technology where appropriate, to help support individuals. This could be used to help understand the role of physical activity in the treatment of mental and physical well-being, and helped inform health and social care professionals to provide tailored care. Not all healthcare settings were set up to maximise the potential of patient-generated data to monitor mental health problems. It is also important to consider that monitoring is not useful for everyone.

Finding 10. Clear guidelines are beneficial for initiating and incorporating lifestyle changes. These can help inform men and women with bipolar disorder and their carers, but also influence how care is delivered by health and social care (moderate confidence).

Establishing a plan, starting with small changes, and setting and reviewing goals regularly were suggested as effective ways of initiating positive lifestyle changes (Bauer 2018; Filia 2012; Hensley 2008; Pereira 2019; Suto 2010), and this resonated with earlier findings that highlighted the importance of structure and routine in managing bipolar disorder and developing autonomy and control. Bauer 2018 used focus groups to explore the elements of designing a lifestyle intervention, and participants recommended the use of goal setting that could be reviewed but could also give people a sense of achievement, *"These goals should ideally be reviewed and renewed after a set number of sessions. The latter would give everyone a sense of accomplishment and satisfaction."* (Bauer 2018, p. 558). Participants also suggested that a structured programme would help encourage information, support, and accountability, *"Participants emphasized the need for a structure including lectures and external speakers, a list of goals to be achieved, and the presence of a trained mental health professional facilitating the intervention."* (Bauer 2018, p. 558).

Hensley's personal account of initiating lifestyle changes with the support of a dietician described how small incremental steps were successful, starting from *"One meal at a time, she and I established new guidelines for eating ... I entered an action phase: I made a commitment to myself that I would use the next year to get more physically fit and hopefully lose some weight. I have not always followed my personal guidelines perfectly, but more often than not, I follow them, and I feel better."* (Hensley 2008, p. 248).

Finding 11. Men and women who understood bipolar disorder had better insight into managing and improving care using physical activity (high confidence).

Males and females in Bauer 2018 demonstrated a good knowledge base, with participants sourcing information about bipolar disorder from multiple sources including books, newsletters, the internet, attending groups, and talking to health professionals. It was clear from the accounts that approaches to maintaining well-being varied among people, but a recurring theme was the importance of creating balance and managing physical activity levels appropriately as an effective way to manage mood (Eden 2022; Wright 2012). Sharing this messaging with others with experience of bipolar disorder was important and providing the support to help to achieve the right balance, *"Sometimes exercise makes me go high if I kinda do it too much. Like, if I book up for a race and then go out running every day of the week it does sound a wee bit loopy. So, I'm more likely to exercise when I'm high than when I'm low."* (Female, 34, normal BMI in Chalmers 2020, p. 123). Similarly, one health professional found that people she supported would over-exercise, *"To the extent that he was overly doing it. So he would become obsessed with exercise and fitness and so it wouldn't be that he would just cycle fifty miles a week, but he would then go out at the weekend and do like big treks and exhaust himself. So … he would kind of dip into that kinda mania."* (Clinician, ID2 in Chalmers 2020, p. 155-6).

Being vigilant about mood and monitoring any changes could indicate that someone was becoming unwell (Suto 2010). Fluctuating mood and motivation is characteristic of bipolar disorder (Bauer 2018; Chalmers 2020; Eden 2022; Wright 2012), *"when I get into something, I'm very committed to something, then there's no stopping me, right? And I'll get right into it and I'll be there all the time, and I'll be fully active and I'll fully support something, and then at other times I'm less committed to things."* (Male, 43, obese BMI in Chalmers 2020, p. 126). *"the desire to do physical activity is much higher when I'm higher and lower when I'm lower."* (Eric in Eden 2022, no page number). *"When I'm low I just can't be bothered" (*Female, 34, normal BMI in Chalmers 2020 p. 123).

One clinician demonstrated the flip side of this, and the importance of understanding people's current mood, which could be an indication of motivation and compliance levels, *"somebody's recovering from a manic episode, you know, they may well be quite motivated to do these things"* (Clinician, ID3 in Chalmers 2020, p. 160). Different levels of energy and motivation were common experiences (Bauer 2018; Eden 2022; Wright 2012), and had implications for the design of interventions that acknowledge mood variation by "modifying an exercise programme as a means of proactively managing mood fluctuation" (Wright 2012, p. 637). It was also beneficial that people supporting them were aware of these changes and offered an appropriate response, *"I mean he seems, when he has become unwell it's very apparent. You know, it's very obvious to friends and family of his because he would start to maybe withdraw from things, so instead of playing five-a-sides a couple of times a week, he would withdraw, or, and so the brothers or friends would be like, 'Hmm … what's going on here?' So they would know to maybe try and get involved a wee bit more."* (Family, ID9 in Chalmers 2020, p. 155).

Challenging maladaptive patterns of behaviour was a complex process that required multiple steps (Bauer 2018). While physical activity could be helpful for mood regulation, engaging in it was not always that easy, *"I'm always a bit wary of saying to people, that exercise helps my mood. Because … I can't bear that 'well why don't you just go out for a walk' ... I've always known, you know, that it will help to a certain extent but also if you're seriously unwell it's not going to make the blindest bit of soddening difference either ... you don't want to be too prescriptive and say well if you just went and did some exercise then you'd feel better."* (Sarah in McCullough 2021, p. 139). *''if I was in depression to go right, I know exercise is going to make my mood better, that would take a lot for me to do.''* (Abbie in McCullough 2021, p. 139).

Others had established a regular routine of physical activity despite fluctuating mood; this meant adjusting the level or amount exercise they did, but physical activity was considered by this group as *"not just beneficial, but essential"* in terms of managing mood (Eden 2022, no page number). *"So low energy weeks, depressed weeks tend to be shorter and less exercise - not less because I can't do the exercise itself but the barriers to getting there are higher during those weeks. I'm having to talk myself into it rather than just doing it."* (Eden 2022, no page number). The importance of maintaining a routine was also evident in Chalmers 2020 and Wright 2012. *"I don't think it's as much effort as some people find it to go. I mean, there's always times when you think 'Oh, can I be bothered?' But now I'm doing it in the weekly pattern, I don't feel that. That's just the routine. I don't dislike going."* (Female, 51, obese BMI in Chalmers 2020, p. 135). *"Several participants who engage in regular exercise expressed the view that their mood would decrease if they did not exercise regularly"* (Wright 2012 p. 638). *"it's kind of part of my routine and I know that if I don't do it over three or four days then, yeah, my mood is going to drop slightly probably"* (Alice in Wright 2012, p. 638). *"It's getting into a routine that's the hard part and the key for success, I think."* (Male, 43, obese BMI in Chalmers 2020, p. 135).

There was an acknowledgement that lifestyle changes needed to be worked at and maintained (Hensley 2008; Suto 2010). Regular self-monitoring and adjustment required considerable effort and diligence, *"It's a lot of maintaining and you're constantly working on it"* (Suto 2010, p. 80). *"losing weight and adopting a healthy lifestyle is something that you have to work at consistently, over time, in order to make it work."* (Hensley 2008, p. 248).

Sleep and the importance of waking rest was an important aspect of bipolar disorder, with poor sleep both a symptom of the disorder and a wellness strategy and relationship between sleep and daily exercise (Suto 2010 (Murray); Switsers 2018). Sleep quantity and quality could impact on decision-making and food choices and impact negatively on taking part in physical activity (Chalmers 2020). *"When he's unwell [mania phase], sleeping goes out the window. It's like awake early, can't get to sleep, then awake really early, that kind of thing. But I would still encourage him to, when you're unwell to be, 'Right, go to bed at this time and …' not have big long lies, not stay up really late or quite often it would be falling asleep on the couch. You know, if he didn't go to bed at the right time. And I'm away to bed and then he'll fall asleep on the couch. So, I'm saying, 'Come up to bed now or don't be falling asleep on the couch,' 'cause like getting that kind of rhythm, and that pattern for sleep's really important as well, and he does know that. It's just not that you always want to do it."* (Family, ID9 in Chalmers 2020, p. 161).

Finding 12. Physical activity should form part of a treatment plan for both men and women with bipolar disorder (moderate confidence).

Many of the respondents did not understand the benefits of exercise and said that they had never received advice from health professionals that exercise could be beneficial (Pereira 2019). Medication was considered the only possible way of managing their disease (Pereira 2019), *"most of our sample did not exercise regularly, nor knew how exercise can positively influence their disorder"* (Pereira 2019, p. 1).

The only benefits promoted by professionals related to weight loss. This raised some concerns. While exercise has a role in weight loss, it is probably more important for weight management. Weight loss is modest from exercise alone, and other studies have reported disappointment from participants that have not lost weight, which in turn can be demotivating and lead to discontinuing, *"exercise training was rarely associated with the treatment for bipolar disorder. The only benefit associated was weight loss, citing the promotion of self-esteem as a motivating factor to maintain an activity."* (Pereira 2019, p. 5).

Experiences of first hospital admission were that physical activity often did not form part of early treatment plans; both male and female service users were encouraged to tailor back activities to help inform treatment plans, which included stepping back from social networks to the extent that the system could become a disabling process (lived experience), *"I was in hospital last year, maybe three times. I was in for about three months at one point, and I was doing no activity at all really. I might get out a walk to the shop or something like that but you tend not to be doing too much activity in hospital."* (Male, 43, obese BMI in Chalmers 2020, p. 135).

Clinicians agreed that the hospital setting did not easily facilitate physical activity, and that spending time on a ward can restrict individuals, *"The biggest barrier here was the restricted environment. People don't have free time ... that makes a big difference on people's recovery, their motivation for recovery, the momentum of the recovery and obviously their kind of impact on fitness levels as well."* (Clinician, ID2 in Chalmers 2020, p. 135).

Some health professionals were described as being unhelpful and condescending at times (Filia 2012; Pereira 2019). Filia 2012 recommended that *"The provision of relevant education to health care providers may neutralize unhelpful staff attitudes"* (Filia 2012, p. 294). It was also important to acknowledge experiences that exercise or physical activity was not always beneficial, and for some exacerbated mania symptoms (Wright 2012).

For many male and female participants, physical activity was not mentioned as a part of their treatment plan or how it might contribute as a tool in symptom management (Bauer 2018; Pereira 2019; Suto 2010; Wright 2012). *"I'd like to be doing a bit more, because of course, you know, there is evidence that being active, and regularly active, is good for your general well being and mental health ... for some people unfortunately, that's not enough to contain or maintain their illness, or keep them relapse free. But certainly it shouldn't be … neglected."* (Clinician, ID5 in Chalmers 2020, p. 162). The clinicians interviewed as part of the Chalmers 2020 study recognised the potential benefits of physical activity, but this did not seem to be the routine experience of others. Health professionals indicated that there were already systems in place to give people access to physical activity programmes, *"Live Active scheme, GP referral system, which kind of got him a discount, I think, at the time, and he also linked in with, you know, professionals writing his treatment - not his treatment programme, his exercise programme."* (Clinician, ID2 in Chalmers 2020, p. 179), but access could be better, especially in inpatient settings, *"I think better access to things like the gym and … dieticians, having … more robust Activity Coordinators who are able to deliver,… when appropriate, … a robust package of activities and things like that for people when they're inpatients to access."* (Clinician, ID3 in Chalmers 2020, p. 182). *"I think if we could … make the inpatient system even more robust and even more well developed in terms of,… more activities, better … equipment. 'Cause the gym in [hospital] pretty basic, whereas if it was … a bigger gym that could take more people, if we had … more than one physiotherapist … that would be able to do this. … You could set up a really good physical health intervention package in the inpatient setting an' then you could do a similar thing … in the outpatient setting for individuals. And then obviously there's a total gap in terms of the dietician support for outpatients."* (Clinician, ID3 in Chalmers 2020, p. 183).

Participants described how physical activity could be effective in improving their mood. If the participant was able to find the energy and motivation to engage in physical activity when they were in a low mood state, it could help them to feel better, moving their mood back towards the "middle ground". (Eden 2022). Noel used exercise as a "treatment plan" following an episode of mania requiring hospital admission "and has been participating in 3.5 h of exercise every day. He commented that '*exercise has reduced the mood cycling … the time between, sort of each cycle's extended since I've been exercising lots*'" (Noel in Wright 2012, p. 638).

Finding 13. The enabling role of trained, multidisciplinary professionals was highlighted. Having the right health and social care professionals can deliver a holistic approach to care (high confidence).

The understanding and support of appropriately trained professionals was important on a variety of different levels (Bauer 2018; Chalmers 2020; Filia 2012; Hensley 2008; Pereira 2019; Suto 2010; Wright 2012). Participants in Bauer's focus groups highlighted the importance of having physical activity facilitators that had a good expert knowledge of mental health, *"the presence of a trained mental health professional facilitating the intervention"* (Bauer 2018, p. 558). This could be delivered by multidisciplinary teams involving a wide range of professionals, *"psychologists, psychiatrists, nutritionists, experts in sports medicines, lifestyle coaches, dieticians and fitness trainers as essential to improve adherence to a lifestyle intervention."* (Bauer 2018, p. 558).

The relationship with health professionals was key, not just seeking help as a means of staying well (Suto 2010), but adopting lifestyle changes within a supportive setting (Chalmers 2020; Hensley 2008; Pereira 2019). Health professionals that showed empathy and understanding were required, especially when initiating activity at the beginning, *"The lack of courage to start, depends on the person, the instructor"* (E12 in Pereira 2019, p. 5). Hensley described the skills of the dietician supporting her lifestyle changes, *"The dietician was gentle. She asked me questions about my eating habits and about my goals. She unknowingly adopted a harm reduction approach to my weight situation. She did not suggest that I go on an all-out diet immediately. Instead, she asked me about the easiest place to start."* (Hensley 2008, p. 248). Filia 2012 stressed the importance that *"Establishing contact with other health care providers involved in the patient's treatment at the outset is a good practice".* (Filia 2012, p. 293-4), and that *"A united and consistent*

message … from all health care providers is necessary." (Filia 2012, p. 294).

Only one study collected data on the views of health professionals, so it is difficult to generalise the results; however, the findings were interesting. The clinicians interviewed by Chalmers discussed some of the techniques they used to motivate and support individuals, *"So if you don't have the motivation to begin with, then they're in that kind of pre-contemplative stage and you're gonna have to seed some, some sort of worries for them. You know, try and stir up a bit of cognitive dissonancy, 'Oh, I know you like your food, and I know this medicine's kept you well, but you know, you might die fifty years younger than the rest of the population because you've got bipolar disorder.' And that kind of … Obviously, I wouldn't say that"* (Clinician, ID4 in Chalmers 2020, p. 159). *"And then, you know, a bit of motivational interviewing to try and encourage them to change, a bit of signposting in terms of, you know, what they should do ..."* (Clinician, ID3 in Chalmers 2020, p. 159). *"If they said to me that they're fed up looking at this [themselves], they want to change it, if they've been diagnosed with diabetes, they're scared, then that's, you know, you pick it up on whatever wee angle that you can get into them."* (Clinician, ID1 in Chalmers 2020, p. 160).

Where health professionals delivered inpatient exercise sessions, people found it easier to establish routines of regular exercise, *"So I [OT] would be exercising with him. I would be going along to the gym with him and we'd set a programme, we'd do that together, and then I would step back and just let him get on with it and then I would start to prescribe exercise on a more regular basis without support."* (Clinician ID2 in Chalmers 2020, p. 170-1).

Structured activities delivered in inpatient wards encouraged patients to be more active and helped facilitate positive behaviour change. *"So certainly for the mile walk, the person that sort of coordinated that is very visible on the ward and known to the patients on the ward, so she was very good at motivating people, you know, to get them out to do the kinda mile walk even if the weather wasn't great."* (Clinician ID3 in Chalmers 2020, p. 159).

There was an admission that more could be done to support physical activity and healthy eating within services, and this could be promoted in the training and teaching of staff, *"I've also taken an interest in ensuring that ... our staff more widely are aware of the need to have such conversations with people with bipolar disorder. So I've done teaching, you know, teaching on the topic, presenting on the topic, and I've also, you know, helped develop a programme of training for staff, you know, with a focus on health improvement and, you know, co-morbid long term conditions, so that our mental health - largely mental health nurses, occupational therapists - when they're working with patients, they have a background knowledge of this."* (Clinician, ID5 in Chalmers 2020, p. 176).

Finding 14. Finding the right support. There was a range of things that facilitated participation and encouraged men and women to be active. Having support, whether from professionals or friends and family, was important (high confidence).

The importance of finding support to undertake physical activity was featured across studies, whether this was from professionals (Hensley 2008), family or friends (Eden 2022; Pereira 2019; Suto 2010; Wright 2012). The 'role of others' was particularly important in the physical activity-bipolar relationship when experiencing low mood (Eden 2022), and *"as a means of bolstering motivation to exercise during depressive periods and of reigning in activity during periods of high mood, ultimately enabling the individual to regulate their exercise in the most helpful way."* (Wright 2012, p. 639). *"Spouses/partners were often mentioned as people who had learned the warning signs of mania and depression and encouraged their loved one to initiate wellness strategies."* (Suto 2010, p. 80). *"I think my husband is really important because he will notice a depressive episode coming on before I will and he can tell by my body language. He says I walk differently. I carry myself differently and there is a look in my forehead and my eyebrows. He picks it out before I do … He makes me aware of it and [then] I will just become more diligent about exercise, eating right, more sleep and trying to … I guess, reassign priorities."* (Suto 2010, Murray p. 101). *"relying on social support was mentioned as relevant to deciding to start and keep an activity"* (Pereira 2019, p. 6).

Eden developed the theme of reliance on others, which emerged as a result of a number of participants describing how in periods of lower mood they relied on friends and family members for support and encouragement, to "hold their hand" or "in some cases even drag them outside to engage in physical activity", as otherwise they would not do it (Eden 2022, no page number). *"I remember a long time ago being on a low period and going out with a friend and walking along the canal and it helped. It helped a lot but I don't think I would do it by myself. If I managed to you know have help from friends who would walk with me and then I knew it made me feel better"* (Eden 2022, no page number). This concept of a helping hand was also referred to in Pereira 2019, *"If I had someone to tell me, 'hey, let's go and I'll go with you', I would go for sure. Now, if you expect me to go, it's hard."* (E7 in Pereira 2019, p. 5). *"Like, [my cousin] often, you know, says 'Ah, come for a run on Sunday', and she'll kinda pester me, which is what you need."* (Female, 34, normal BMI in Chalmers 2020, p. 137). *"... he would always [say], 'Oh, I feel a wee bit better having done that. I'm glad I've done it.' So, aye, when he has been in the quite unwell stages, that would be something we would - I'd say every day, 'Right, come on, we'll go out.' Once I've was in from work or whatever, 'Right, we're going out a march.'"* (Family, ID9 in Chalmers 2020, p. 162).

Having friends and family that were understanding as well as encouraging was also beneficial. Social support could help in managing the barriers to exercise or physical activity. *"No, he'll just send me a text and he'll say, so for example, last Friday or Saturday, I think he sent me a text, just, the weather wasn't very good on the Saturday, he said 'the weather's to be nicer tomorrow, d'you fancy a game of golf?'"* (Male, 43, obese BMI in Chalmers 2020, p. 138). One participant spoke about combining exercise and socialising and how this encouraged her to take part in exercise. Another participant said that this was particularly important when neither of them really wanted to exercise. *"It's a combination of exercise and social and, you know, seeing people that I'm fond of, and just getting out"* (Female, 55, normal BMI in Chalmers 2020, p. 137). *"neither of us I think really want to go, if that makes any sense, but we know we kinda need to go and we know it's good for us to go, so we kind of have a wee laugh with each other and kind of gee each other on and cheer each other up."* (Male, 43, obese BMI in Chalmers 2020, p. 137).

However, sometimes being reliant on others for support led to people not exercising if their friend cancelled, *"Pissed off basically. 'Cause I'm like, you know, I didn't go out last night 'cause I knew we were going to go for a run this morning and then she'll maybe text*

me, 'Oh, I just want a lie in with my husband' and I'll be like, 'Urgh'. You feel a bit like, 'cause I know I won't go for a run myself then, whereas I would have gone if we were going together. So, I suppose it's a bit demotivating isn't it. And I had another friend that for a while I was climbing with quite a lot but she kept letting me down and I ended up just not arranging with her any more." (Female, 34, normal BMI in Chalmers 2020, p. 138).

Lack of social support can be a barrier and impact negatively on exercise and actually stop people from exercising. *"She tried salsa as well but it's quite couple-y ... but the class that she went to a couple o' years ago maybe now, it was all couples and they were quite cliquey, so I don't think she felt ... said she felt excluded from the group and she didn't like the way it all made her feel, so she didn't go back."* (Family, ID6 in Chalmers 2020, p. 170). *"I don't think she has any proper friends that do exercise classes. Her best friend ... doesn't exercise at all ... Her other friend ... I don't get the impression she does any exercise. She's a wee bit older, I think she's in her 60s, but not that that would stop her from exercising, but she doesn't - I don't get the impression that she does anything either."* (Family, ID6 in Chalmers 2020, p. 170). Where people did not have social networks to rely on, volunteering was identified as a means to connect socially, *"what I've noticed is that when I have a bit more outward kind of motivation and movement and being involved in the world, in helping other people or even just giving things away or giving of my time and energy, that's really helpful in terms of keeping balanced in my own life."* (Suto 2010, p. 81).

The role of pets was mentioned in three studies (Chalmers 2020; Eden 2022; Wright 2012). Eden 2022 described this subtheme as "I am needed" where participants described other living beings (animals or plants) dependent on them which required them to be outdoors and being physically active even if their mood, energy, or motivation was low. *"If I get more depressed then it would drop even more, you know, I probably wouldn't go swimming at all, umm, and my walks with the dog would be less, I, you know, the best thing I ever did with regards to my bipolar was to get the dog 8 years ago"* (Tamara in Wright 2012, p. 637). *"Walking routine with dogs but only form of physical activity that she does and she does this at a relaxed pace."* (Family, ID6 in Chalmers 2020, p. 167). *"She does take them - in the afternoon, she'll take them on a walk round the park, which is probably about a mile, a mile and a half"* (Family, ID6 in Chalmers 2020, p. 167).

Finding 15. Mood regulation is an important aspect of managing symptoms of bipolar disorder, and monitoring mood and physical activity, including the use of technology, may be helpful for men and women with bipolar disorder (high confidence).

Murnane 2016 surveyed a sample of people with bipolar disorder about the role that technology played in the management of their symptoms, and a further four studies explored monitoring in their research (Bauer 2018; Chalmers 2020; Suto 2010; Switsers 2018). Murnane's study considered the role of technology in monitoring bipolar disorder and tracking to inform self-reflection and increase *"self-awareness of BD patterns, triggers, and effective coping strategies; enabled the development of self-efficacy and self-compassion in respect to condition management; and facilitated conveying information about their moods and behaviors to caregivers".* (Murnane 2016, p. 482).

Monitoring mood and activity offered a number of benefits for supporting people with bipolar disorder, the process of tracking of early warning signs or potential triggers that could mean a change in mood or help to encourage health behaviours including being more active (Switsers 2018). The importance of playing close attention to mood and noting changes has already been discussed; however, the role that technology can play to help accurately record these changes was helpful. The potential for sharing data with health professionals could also contribute to treatment, but the utility of technology varied greatly. Bauer found that in discussions about intervention design, people were interested in the potential of digital technology to support their health, *"there was openness to using digital applications to track mood and lifestyle habits."* (Bauer 2018, p. 558). Some participants reported that apps and technology helped link exercise to mood improvement, *"it [running app on phone] shows you patterns so you can go back and see when you were doing a lot of running and when you weren't, so it does kind of tie in with my moods thing as well. 'Cause I used an app on my phone for quite a while there about logging your moods and I would always put a note on it if I'd been for a run or anything."* (Female, 34, normal BMI in Chalmers 2020, p. 133). *"I will just become more diligent about exercise, eating right, more sleep, and trying to reassign priorities."* (Suto 2010, Murray, p. 100). The visual feedback that technology offered was helpful, and the data produced could act as a starting point for talking to health professionals (Murnane 2016). Murnane 2016 also reported that for some, there could be a mindfulness element to monitoring, and externalising information tracking could act as process of release.

Digital technology was not always necessary. Those interviewed demonstrated different approaches of recording information, *"The forms of paper based tracking that participants mentioned using include journals, sticky notes, charts, and calendars. Some respondents print out templates found online, while others create individualized scales, in which, for instance, numbers correspond to self-defined mood states."* (Murnane 2016, p. 478). *"respondents reported turning to external tracking via paper or technology when they need extra support, for instance when thoughts get 'scrambled' or their mind feels too 'full' - sensations that are especially common during BD episodes."* (Murnane 2016, p. 478-9).

There were some drawbacks highlighted in the evidence. Murnane found that technology could be agitating for some, or trigger episodes or problematic experiences (Murnane 2016). A clinician in Chalmers' study also had experience of poor-quality devices that were not fit for purpose; the health professional spoke about their experience of using pedometers. *"We had bought hundreds of pedometers since I've been here, for sure. They're all not very good regardless of what you pay. We've bought really expensive ones, we've bought cheap ones, and they all end up down the toilet or stood on or just not working that well."* (Clinician, ID2 in Chalmers 2020, p. 181). Murnane raised the point that technology is not always easily shared with, or interpreted by, clinicians, and others felt that it could not replace personal contact, *"I think it's actually, it doesn't help communication. It makes it worse. I'd rather talk to somebody, see their eyes, see their body language, hear the tone of their voice."* (Male, 67, obese BMI in Chalmers 2020, p. 133). Another participant in the Chalmers study also preferred social contact to motivate them rather than relying on technology, *"Probably like somebody to motivate me. Where if somebody came to my door and said, 'Right we're gonna walk,' I would go. It's just me trying to get over that door*

is very difficult. It's very isolating when you're down," (Female, 56, overweight in Chalmers 2020, p. 144).

Theme 4. New Domain - Finding what works: Finding the right type of exercise in the right setting with balance and structure to improve sustainability

No one type of physical activity was recommended; finding what suits and works for individuals was important, taking into consideration other suitability factors such as current levels of activity, cost, and access to increase the potential for sustainability. Rhythm and routine brought balance and structure for men and women with bipolar disorder. Incorporating regular physical activity into a daily routine offered structure and purpose within a daily schedule, but also the physical aspect of undertaking repetitive, rhythmic exercise like walking and running contributed to balancing and regulating mood. There was a careful balance to achieve to avoid over- or under-exercising, which could exacerbate mania or depression. There is some evidence that circadian rhythms are disturbed in bipolar disorder, and it may be that rhythm provides some contribution to help reset this balance. Negative coping mechanisms, or a lack of coping strategies for bipolar disorder could affect engagement. Providing support to develop alternative approaches was beneficial. Spending time outdoors and connecting to nature when being physically active could convey additional benefits. Physical activity is one aspect of promoting well-being for people with bipolar disorder and can be a helpful way to manage symptoms. Sequencing multicomponent interventions that tackle a range of health behaviours is feasible and may be beneficial for improving overall mental and physical health.

Finding 16. Accessible, sustainable interventions and finding the right type of exercise were all identified as important. For many women and men, the right type of exercise was walking (high confidence).

Walking was mentioned as an accessible, low-cost, and low-impact intervention that also provides people the opportunity to interact with their social environment (Pereira 2019), *"accessibility is one of the environmental factors that can hamper or promote their integration in an activity. This is an important advantage of walking, which becomes a democratic and relevant ally in health care, because it can reach a large number of people from different places and financial situations, promoting health habits and preventing diseases. It appears relevant to mention that the practice of walking, can generate clinically significant health benefits."* (Pereira 2019, p. 7). Even from low starting points, walking can be an encouraging way to initiate exercise and monitor improvements, *"I started exercising, too. At first I could only walk for about five minutes at a time before becoming out of breath, but now I am up to twenty-five minutes at a stretch."* (Hensley 2008, p. 248). The female participant in the case study by Filia 2012 taking part in the trial of a lifestyle intervention also participated in a walking programme, *"At the commencement of the program, Ms. A was walking only short distances. From weeks 4-14, she was inactive due to the depression. By week 18, Ms. A commenced a walking program. She started by walking 20 min a day four times a week, and increased this to 40 min a day six times a week by the end of the intervention."* (Filia 2012, p. 291).

Health professional participants highlighted that attempts had proved successful when patients had been advised to make little changes that they themselves felt were manageable. *"'We agreed that this week you were just going to not take five sugars in your tea. That was it. That was all. ... What about you said you were going to go and walk round the grounds for three fifteen-minutes throughout the day. Can you do that?' and if they think 'Oh, aye, that's more do-able', then I say 'that's fine ...'"* (Clinician, ID1 in Chalmers 2020, p. 169).

Gyms and exercise class settings can be intimidating; however, many participants said that they have established regular walking routines where they get fresh air and exercise, *"If not most days, then certainly every second day I'll try and get oot a walk, even for as little as half an hour, just kind, to be kind of roon the village, stretch my legs type thing."* (Male, 43, obese BMI in Chalmers 2020, p. 135).

Finding the right type of exercise (Suto 2010; Switsers 2018; Wright 2012), and the importance of trying different types of exercise to suit interests, fitness, and energy levels could be beneficial (Pereira 2019) *"I think the key thing … is to give them … the options to do different types of exercise in terms of the amount, energy that they want to expend"* (David in Wright 2012, p. 379). For many, this might involve some sort of rhythmic or repetitive *"sports such as running, walking, swimming and cycling were much more regularly mentioned in a positive light than sports such as racket and team sports, which are less likely to permit a regular repetitive rhythm"* (Wright 2012, p. 639). *"I would push for stuff that has got …this repetitiveness about it because I think that's kind of steadying"* (Alice in Wright 2012, p. 369). Additionally, one of the inpatient health professionals indicated that they had exercise groups that promoted improvement in other areas of life, not just the health benefits, *"We had a climbing group as well, which was a really kind of successful venture with the community team and that just - not only exercise, but was about relationship building and trust and stuff like that, so, you know, we're … we're keen to be thinking outside the box when it comes to healthy lifestyles and exercise."* (Clinician, ID2 in Chalmers 2020, p. 163).

Accessibility as well as sustainability is also important; offering gym membership under existing employment or welfare/health insurance schemes could help this (Bauer 2018; Suto 2010), and incorporating opportunities to exercise in treatment settings, *"When the gym here at the hospital opened, I applied."* (E13 in Pereira 2019, p. 5). Delivering interventions with the public realm was suggested by the lived-experience experts, citing the example of cardiac rehabilitation care being delivered in a walking group where each participant gets time to talk with a health professional about their mental well-being, medication, and any problems they are experiencing.

Lastly, having fun, engaging with others, and enjoying what you do were important (Bauer 2018; Eden 2022; lived experience), *"The whole activity experience was a positive, enjoyable one."* (Eden 2022, no page number).

Finding 17. Finding balance, rhythm, and structure and establishing a regular physical activity routine was beneficial (high confidence).

For a number of male and female research participants, physical activity could contribute to finding balance, which helped symptom management (Chalmers 2020; Eden 2022; McCullough 2021; Murnane 2016; Pereira 2019; Switsers 2018; Wright 2012), but required motivation (Bauer 2018). This could be achieved through the establishment of new habits, a regular routine, and structure

in daily activities (Hensley 2008; Murnane 2016), and gave people a sense of control (Suto 2010). The role of health and nutrition *"actions were part of routines that gave structure to participants' lives, and thus helped many of them feel balanced and control."* (Suto 2010, p. 79). *"Exercise has the potential to help individual structure their lives, providing routine and thus contributing to mood regulation."* (Pereira 2019, p. 1). Evidence also suggested that a lack of structure or regulation and balance in a routine could affect mood. However, the symptoms of bipolar disorder could interfere with maintaining physical activity, *"I've always liked exercise, but everything I start I do not end because of depression, and from there the depression would 'catch' me"* (E5 in Pereira 2019, p. 5).

Wright describes this as a "double-edged sword" (Wright 2012). If unregulated, *"Those participants who did not regulate their exercise patterns tend to feel more strongly that exercise can exacerbate symptoms of mania than those who actively and consistently practiced exercise regulation"* (Wright 2012, p. 638).

Without having exercise established as part of a regular routine, *"You tend not to do anything and it's just a horrible unstructured day, whereas when I'm exercising … it sort of, you know, it breaks up the day"* (Nancy in Wright 2012, p. 638). However, the amount of physical activity needed to be carefully managed and not exacerbate symptoms. A counterintuitive relationship was described, where low-level activity was beneficial for reducing hypomanic episodes, and high-energy activity was better for lifting low mood, but this conflicted with normal paths of decision-making depending on the mood state (Eden 2022; Wright 2012), *"If you are a bit manic then you need to do calming down stuff, and if you are down you need to do winding up stuff really. You've got to do the opposite of the way you feel"* (Harriet in Wright 2012, p. 638).

Exercise was described as having the potential to "wind up" or sustain mania if not regulated carefully (Eden 2022; McCullough 2021; Wright 2012). Exercise routines could be intermittent (Pereira 2019; Wright 2012), and fear was expressed that exercise could introduce further chaos and trigger a manic episode; this would lead to a reduction in the level of physical activity to concentrate and conserve energy to feel better (Switsers 2018; Wright 2012).

Over-exercising could be damaging when experiencing high mood, *"power walking, you really can't stop yourself, you just have to … it's like pressurized speech - it is not good for you at all … you are actually winding yourself up further"* (Catherine in Wright 2012, p. 638). Eden 2022 illustrated the importance of careful regulation in similar terms to Wright 2012 and the need to tread a fine line, warning that exercise *"can drive you into mania beyond the realms of reality and reason"* (Eden 2022, no page number). *"It's hard to keep control of the situation. And there have been many periods when I've failed totally to keep control of the situation because of external influences"* (Ben in McCullough 2021, p. 140). Physical activity was described as having the potential to be both helpful and harmful (Wright 2012), *"I just don't really think it was very helpful - I think it just sustains it [the mania] - I suppose you should be looking at ways of trying to calm and be calm and relax more and I don't really think it was something that could help with that. I think it just, I think I just wanted to do it because I wanted to sustain feeling high"* (Eden 2022, no page number).

However, maintaining a routine could be difficult if symptoms or mood began to deteriorate, and this was a fear for some (Wright 2012).

Establishing a regular routine with the demands of daily living was not always easy (Chalmers 2020; Pereira 2019; Wright 2012). A family member commented that the person she supports does have a problem maintaining an exercise routine because of the demands of a job, *"Working full time and thus having difficulty establishing a routine to incorporate exercise 'But, I suppose time's probably. … one of the factors at the minute because he is back to work full-time.'"* (Family, ID9 in Chalmers 2020, p. 167).

When balance and routine were interrupted, this could signal a change in mood or a sign of deteriorating mental health, leading to *"snowballing symptoms that are difficult to control"* (McCullough 2021, p. 127). McCullough described levels of physical activity or sedentary behaviour as an early warning sign, *"when I go high I tend to … sort of, start off bubbling and going very high very quickly … it's hard to catch things and sort of do anything about it … so very quickly I reach a point where I won't listen to reason and I tend to lose touch with reality … when I get really high that I decide that walking is the best form of transport and I just bump along at quite a pace and just sort of keep going"* (Joanne in McCullough 2021, p. 126).

Using physical activity as a response to early warning signs was mentioned in three studies (Chalmers 2020; Eden 2022; Wright 2012), *"Well obviously physically it's good for you, but I find walking helps me to think and if I'm feeling a bit hyper, burning up the energy calms me down a bit."* (Male, 67, obese BMI in Chalmers 2020, p. 124). Signals could also be picked up by family members or carers too, and this encouraged the use of physical activity to try and manage further deterioration. *"If I am hypomanic it [exercise] calms me down … If my husband thinks I am having trouble breathing he will go and stick me on the treadmill"* (Sharon in Wright 2012, p. 639).

A number of participants relied on a regular exercise routine to maintain stability whether their mood or motivation fluctuated or not, *"the motivation to do it varies, but I'm managing to sort of keep up with the exercise through the moods"* (Noel in Wright 2012, p. 637). *"My exercise habits are particularly routine, you know, so I, I do it however I feel"* (Tim in Wright 2012, p. 637).

Regarding type of exercise, it was suggested that rhythmic, repetitive activities such as walking/running could also be beneficial, which ties in with some of the literature around the role circadian rhythms may play in bipolar disorder (Suto 2010; Wright 2012). *"I certainly do feel that my thoughts are a bit chaotic … I think that the rhythmicity of the kind of exercise that I do, I think it helps actually settle down, settle down the thoughts"* (Alice in Wright 2012, p. 639). *"There's something about the rhythmicity of pacing and walking that is really, really, useful … there's something settling about it"* (Alice in Wright 2012, p. 640). *"I consider that a very important part of my overall balance, the walking"* (Suto 2010, p. 79). Walking was once again identified as an effective way to be active; everyone can do it, it does not cost anything, it may present opportunities to connect with nature, and also convey some of the benefits around rhythmic repetitive exercise.

Eden describes the bipolar mood spectrum and the aim to maintain balance within safe zones around the centre. This imagery of balance and centring was evident in other studies, *"To me it's an ongoing basis where it's like a ship that's always righting itself, you know. Or when you're driving, you're sort of correcting as you're trying to drive in a straight line. So those were the things that I see, and then I make minor adjustments and hopefully I don't have to*

make major adjustments because I've been always making these corrections." (Suto 2010 (Murray), p. 100).

"The things that I need to do to stay in balance, and I realize when I tell other people they sound so silly, so trite, and you read them in every ladies' magazine you'll ever see: exercise regularly, get enough sleep, and eat a healthy balanced diet." (Suto 2010, p. 79).

Finding 18: Appropriate coping strategies may support engagement in physical activity and other health-promoting behaviours (low confidence).

Three studies highlighted the relationship between negative coping strategies and capacity to modify behaviours (Chalmers 2020; Filia 2012; Hensley 2008). These studies demonstrated reliance on alcohol, eating, and smoking as a way of managing stress, and they identified a lack of alternative coping skills when mood was fluctuating. For Hensley 2008, this was part of a vicious cycle where poor eating could disrupt mood, which then reinforced the negative coping mechanism, *"she helped me to see that when I did have fluctuations in mood, there were ways to deal with that besides overeating … I no longer have food as a coping skill, but then again, my moods are more stable because I am eating for nourishment."* (Hensley 2008, p. 248).

Filia 2012 offers some practical guidance to develop new coping skills and problem-solving strategies to help change behaviour patterns using role play.

Finding 19: Connecting to nature when undertaking physical activity may convey additional benefits (moderate confidence).

Four studies provided evidence of the benefits of exercising outdoors (Chalmers 2020; Eden 2022; Suto 2010; Wright 2012), highlighting some of the therapeutic affects of connecting with nature, which also increased motivation to be physically active.

Participants in Eden 2022 described being outside as "therapeutic" and discussed the benefits of mindfully being aware of a beautiful natural environment on their mental well-being, *"breathing fresh air in, and feeling good. I'm absorbing, I'm looking at nature, taking in with my eyes what's happening, so it is as if it is nourishment to my soul."* (Eden 2022, no page number). *"I don't know what it is, it's being outdoors, I know to me that is very important, my mood is different if I am outside than inside and it's walking and being forced to notice nature around and be physically active."* (Eden 2022, no page number). A clinician interviewed by Chalmers also referred to mindfulness, *"Yeah, absolutely. And it's not just about the walking, it's getting some fresh air out into the green space and they do sort of mindful walking"* (Clinician ID2 in Chalmers 2020, p. 162).

Exercising outdoors was considered as contributing to part of one's overall balance, "Exercise often involved activities outdoors and the location itself had a salutary effect … *'For me walking by the sea is the best therapy of everything'*" (Suto 2010, p. 79). *"The outdoors has really helped me"* (Suto 2010, p. 79). Evidence in Wright 2012 also discussed the benefits of exposure to daylight and the natural environment.

Finding 20. There are some considerations for designing interventions that promote physical activity for bipolar disorder. These include sequencing multicomponent lifestyle changes, technology, incentives, and health promotion strategies that are gender-sensitive (high confidence).

Exercise was described as "one part of the jigsaw" (Bueno-Antequera 2018), and although the evidence is limited, it does suggest that multicomponent interventions that target different lifestyle behaviours step-by-step are feasible to deliver (Bauer 2018; Bueno-Antequera 2018; Filia 2012), *"lifestyle change interventions are a feasible, effective, and acceptable adjunct to usual care and may protect the cardiovascular health of people with bipolar disorder"* (Bueno-Antequera 2018, p. 334). Sequencing the intervention to target one behaviour at a time may also be helpful (Filia 2012), and providing content that could be adapted depending on whether people are manic, stable, or depressive (Chalmers 2020). Technology may help (Murnane 2016). Expectations should be reasonable, that being active is only one aspect of improving quality of life and well-being, *"there is evidence that being active, and regularly active, is good for your general well being and mental health ... for some people unfortunately, that's not enough to contain or maintain their illness, or keep them relapse free. But certainly it shouldn't be … neglected."* (Clinician, ID5 in Chalmers 2020, p. 162).

Alongside tackling other risk behaviours such as smoking, alcohol use, and diet, many of the studies also identified the importance of good-quality sleep, and being active could contribute to this (McCullough 2021; Suto 2010), *"Maintaining sleep, diet and exercise routines were cited as a lynchpin to maintaining wellness"* (Suto 2010, Murray, p. 103).

Incentives to encourage participation were also suggested in two studies (Bauer 2018; Chalmers 2020), *"my husband has this thing that he has a watch ... and it's connected to a heart monitor that he wears at the gym and he earns points and he gets discounts at Starbucks and cinema and it's linked to his health insurance. So, it's a kinda win-win situation, 'cause he does all the exercise anyway."* (Clinician, ID2 in Chalmers 2020, p. 181).

"Public policies that target people with severe and chronic mental illness, encouraging the regular practice of physical exercise, are necessary … one reasonable recommendation would be the promotion of walking groups, but guided physical exercise promote by health institutions and possibly held where patients receive their treatment also appears logical." (Pereira 2019, p. 7).

Hopeful narratives were also a feature (Hensley 2008; Suto 2010). *"I hope that other people with psychiatric disabilities and their treating professionals can learn from my experience: that change takes time, that even becoming willing to make a change takes time, and that one should never give up on the possibility of recovery and personal growth."* (Hensley 2008, p. 248).

DISCUSSION

Summary of the main findings

Many of the participants in our review were not aware of the benefits of physical activity as a tool for symptom management, and although they were probably aware of the link between physical activity and physical health, they also reported less knowledge about their individual physical health needs. This raises some challenges for the current system of mental health care and whether mental health professionals feel they have the skills or confidence to conduct physical assessments or give advice. The same may also be the case for those providing physical health care who do not feel equipped with the knowledge (Das 2018),

training or motivation (Lobelo 2008), or who do not have insight into the impact that mental health problems have on day-to-day living or the additional physical, psychological, and social challenges individuals with bipolar disorder may face. How health professionals recommend exercise can depend on how active they are themselves. There is evidence that health professionals face similar obstacles to being physically active, which in turn affects their own confidence to counsel patients to increase their activity levels (Mayne 2022). Some mental health treatment settings have also been criticised for fostering negative health behaviours.

The lack of research from the perspectives of carers and clinicians makes it difficult to reach any firm conclusions; however, we did find that participants relied on positive encouragement and prompting from their social networks, as well as receiving cues that their health may be deteriorating. People with long-term mental health problems can become socially isolated, and having ways to connect and establish relationships continues to be an important consideration for supporting care. The COVID-19 pandemic has made the experience of social isolation something most people can relate to, and the severing of links with friends, work colleagues, and family during enforced lockdowns is a collective experience in our recent memories. Empathy and understanding were some of the valued qualities in the health professionals who successfully supported people to adopt lifestyle changes, although not everyone's experiences of care was 'gentle'. Some professionals were perceived as negative influences, and it is clear from the data that more work is required to train and educate the health profession to provide informed and nuanced holistic care. Collaboration across professions was recommended, and we know that interdisciplinary working can bring many benefits for staff and patients alike. Consistent and joined-up messaging was also highlighted as important, and this can only be facilitated where collaboration is facilitated.

The data also revealed that men and women with bipolar disorder still experience discrimination and feel shame and stigma associated with their diagnosis and their physical appearance. While society needs to do more to inform people about mental health problems, providing safe spaces for people to exercise in non-threatening, inclusive, and accessible places could be of benefit. Interventions that consider multiple behaviours are feasible and acceptable, and the concept of marginal gains from elite sport and applied to lifestyle interventions offers an interesting perspective on how to improve overall gains (Nierenberg 2015). Tackling issues associated with bipolar medication, obesity, smoking, alcohol use, poor diet and sleep could all contribute positively to bipolar mood management. These approaches have the potential to redress negative coping skills and improve well-being. Some of the highlighted practical issues might be easy to tackle, including affordability, accessibility, and transport links, and although there is not much that can be changed about the weather, alternative settings could be identified. Inclusive workplace or health schemes and social prescribing schemes that subsidise low-cost gym membership or exercise programmes are surely part of health promotion and early intervention approaches that in the long term reduce the burden on healthcare provision. The loss of confidence and perceived mastery when some people leave school has relevance too. The lack of opportunity to be physically active within inpatient settings was highlighted, and there are good practice examples that could be emulated in other settings (Stubbs 2018b).

There is good learning from the data about what might facilitate increasing physical activity, but this was based on the experiences of women and men who were psychologically stable and ready to adopt new lifestyle behaviours or had maintained a physical lifestyle despite their bipolar disorder. Understanding how to maintain activity levels when people leave full-time education is also an area to consider. Physical activity tapers off as young people age out of school, and the data suggest that people can lose confidence, skill, or mastery, which prevents them from maintaining activity. We need to learn more about people who are not interested or engaged in approaches to reducing sedentary behaviour, but there are promising signs that spending time outdoors and making connections to nature and establishing social contact has added benefits. The importance of achieving balance, rhythm, and routine links into the literature around circadian rhythms in bipolar disorder, but also touches on the role that mindful exercise can have in helping bring balance and routine if monitored carefully. A commonly held fear about the negative affects of exercise in bipolar disorder may be reflected in the narratives concerning over- or under-exercising, which could be counterproductive and accelerate depressive or manic moods. There were hopeful narratives that people were able to strike this balance and reap some benefits. It is important to restate that physical activity remains one part of the jigsaw, but the potential benefits are wide-ranging from reducing social isolation, feeling better, making friends, getting fresh air, and gaining back some control over one's own mental health.

Comparison with other reviews and implications for the field

There are no other qualitative reviews of physical activity for bipolar disorder. This review reports on the limited evidence available, highlighting the need for more and better-quality research to inform interventions including seeking more male service user perspectives, and those of carers and professionals in a range of different settings including low- and middle-income countries.

Overall completeness and applicability of evidence

We identified only 12 relevant studies for this review, involving a total of 592 individuals with bipolar disorder (422 participants who contributed qualitative data to an online survey, 170 from qualitative studies), 5 carers, and 5 clinicians. These were a self-selecting sample, who were clinically stable and ready or interested in engaging in physical activity or lifestyle changes and therefore not likely to represent the experiences of people who are currently too unwell or not interested in introducing changes. The views of family members/carers and health professionals were also very underrepresented. The difficulties of conducting high-quality research with people with severe and enduring mental illness have been well evidenced, and researchers often face recruitment difficulties (Howard 2009). Recruitment challenges and incentives require better understanding (Jones 2019). Research designs should consider accessible ways of engaging people with bipolar disorder in co-creating research evidence. The majority of the research was also conducted in high-income countries, so we cannot tell how generalisable these results are. We were unable to explore some of the modifying factors such as gender, age, ethnicity, and socio-economic status with the data collected.

Another limitation of the data was the lack of interventions; this may have given us greater insight into the barriers and facilitators of physical activity. A number of studies discussed the design principles of potential programmes, but we do not know if any of these interventions would have worked in practice. As already stated, and research in this area is growing, there remains a lack of high-quality randomised controlled trials. The opportunity for co-produced research was also limited in the included studies; other work has shown that co-designed interventions for mental health service users is feasible (Yap 2020).

Based on our CERQual assessments, we had high confidence in 13 findings and moderate confidence in 6 findings that the studies were a good representation of the phenomenon of interest. We graded one finding as low confidence. Our main concerns were related to the adequacy of the data. Common methodological limitations included a lack of researcher reflexivity. We often assessed the data as being only partially adequate, mainly because the included studies were based on very small sample sizes, and representing views of service users (mostly female) with very few focused on healthcare professionals or family members.

Limitations of the review

We made every effort to identify studies with the search strategy design; however, it is possible that some studies were not identified as a result of dissemination bias. The majority of participants were female and from high-income settings, therefore the findings may not be generalisable to other populations, settings, or contexts.

AUTHORS' CONCLUSIONS

The review findings suggest that everyone (service users, carers, professionals) would benefit from understanding bipolar disorder better, becoming familiar with the physical and mental health symptoms that create problems or opportunities and how healthy lifestyle behaviours may improve quality of life and contribute to mood management.

Below is a series of statements that may help health system planners, public health, institutes, health professional organisations, healthcare facilities, supported living or other inpatient settings who plan, implement, or manage health and care for individuals with bipolar disorder. They are also relevant for family members and carers and other people who provide support. These questions build on the findings of this review and are limited by the data we found and the findings we have drawn. While there are clearly gaps in the evidence, these statements may provide a starting point for thinking about how interventions to improve physical activity levels in bipolar disorder could be designed. Our data are only based on a sample of 592 individuals with bipolar disorder, 5 carers, and 5 clinicians; however, they provide some insight into the difficulties people can face and what might be effective in improving care.

Implications for practice

- Men and women can feel shame and stigma associated with their physical appearance and their mental health diagnosis. Providing safe places with similar individuals may encourage participation.
- Males and females with bipolar disorder may have positive past experiences of physical activity. Helping people to reconnect with their positive past experiences of physical activity may help to form part of their future physically active identity.
- People can lack confidence that change is possible. Supporting people to find the easiest place to start; helping them to proceed slowly; setting goals; and monitoring and reviewing their progress regularly may make a difference. Walking groups or activities can be a good place to start.
- It is to be expected that people's mood and motivation will fluctuate. Be prepared for this; helping people to develop positive coping strategies may help in managing these fluctuations.
- Better connections could be made between people's mental and physical well-being. Every contact should count to promote well-being, and people's physical health should be regularly assessed.
- Sharing information and responsibility for promoting well-being is a joint responsibility, and uniform messaging across services may help to reinforce messaging.
- Sequencing lifestyle interventions can help tackle multiple health risk behaviours and may improve outcomes.
- There are gender differences in the risk factors, and different treatment approaches may be required.
- Considering any financial implications associated with being active is important. This includes addressing ways to minimise these, or providing subsidies for involvement (e.g. clothing, transport, gym membership).
- Inpatient settings could consider how best to integrate physical activity within restricted settings and at the early stages of a treatment plan. This may involve thinking about restrictions around technology use.
- People may benefit from taking part in outdoor activities; the possibility of delivering interventions outdoors may help people to access the added benefits available in nature.
- Rhythmic exercise such as walking, jogging, or running may be beneficial.
- Establishing a regular routine and monitoring activities may help to identify trigger points or variations in mood, which may help people to consider the risk of under- or over-exercising that may affect their mood.
- People should be encouraged to take responsibility and be accountable for being active.
- Understanding and promoting the possible psychological, physiological, and social benefits of physical activity for bipolar disorder should be discussed with people.
- Helping people to establish the social support networks beneficial for being active is important.
- Encouraging people to try different types of exercise may help them to find one they like.
- Incorporating physical activity into people's treatment plans should be standard care.
- Training and educating other health professionals about holistic mental and physical health is important.
- Engaging a range of different disciplines may help to support effective treatment and care.

Implications for future research

Further research is required to better understand the perspectives of people not engaged or ready to undertake lifestyle changes.

The voice of carers, service providers, and health professionals was mostly absent. Further work to understand the challenges they face and shared experience of what works would be helpful. Co-produced design and trials of interventions involving people with lived experience is likely to improve understanding and delivery. Further research to inform guidelines for other professionals to implement change is also required. Research into prevention/early-intervention lifestyle interventions for bipolar disorder is required. Future researchers should consider collecting data through participant or non-participant observation in order to explore healthcare worker practice to complement the data including people's views and experiences gathered through interviews and focus groups. More primary research is needed in a broader range of settings, including low- and middle-income settings, forensic, community mental health, and inpatient care. Future research should also consider exploring the influence of demographic factors including age, gender, ethnic background, income, and education level.

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CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Bauer 2018

Study characteristics	
Country	USA
Study aim	To identify what an optimal lifestyle intervention would look like for individuals with BD
Participants	n = 10; mean age = 44.20 years (SD = 11.1), range 26 to 61; 60% female; DSM-5 BDI, BDII or other BD
Interventions	No intervention
Methods of data collection and analysis	Focus group and paired interviews. Multistep narrative analysis (Vaughn 1996).
Funding sources for the study/ conflict of interest	None reported.
Notes	**Methodological assessment** No or minor concerns

Bueno-Antequera 2018

Study characteristics	
Country	Spain
Study aim	To provide examples of real-world case studies that demonstrate how exercise has been used across a diverse range of diagnoses and settings
Participants	n = 1; age = 39 years; female; diagnosis of BD
Interventions	Psychoactive intervention: designed to increase physical activity (walking) and encouraging healthier eating (increased fruit and vegetable intake and liquid supplementation 2 meals a day)
Methods of data collection and analysis	Single case study. Narrative summary only
Funding sources for the study/ conflict of interest	PhD Exercise Science funded by the Spanish Ministry of Education (grant number FPU13/05130). No conflicts of interest reported.
Notes	**Methodological assessment** Moderate concerns

Chalmers 2020

Study characteristics	

Chalmers 2020 *(Continued)*

Country	UK
Study aim	Qualitative study to explore weight management lifestyle strategies for individuals with BD, family carers, and health professionals
Participants	n = 16 adults with BD; age range < 20 to 61+; 88% female n = 5 family carers n = 5 health professionals
Interventions	No intervention delivered.
Methods of data collection and analysis	Mixed methods include qualitative and quantitative systematic reviews, quantitative social network analysis. Qualitative semi-structured interviews. Thematic analysis (Braun 2006).
Funding sources for the study/ conflict of interest	PhD funded by the Medical Research Council. No conflicts of interest known.
Notes	**Methodological assessment** No concerns

Eden 2022

Study characteristics	
Country	UK
Study aim	To explore individuals' lived experience and gain knowledge of caffeine use and physical activity of individuals with bipolar
Participants	n = 20; mean age = 39.2 years (SD = 9.7), range 33 to 71; 60% female; BDI 75%, BDII 25%
Interventions	No intervention delivered.
Methods of data collection and analysis	Semi-structured interviews. Interpretive Phenomenological Analysis
Funding sources for the study/ conflict of interest	Funding source unknown. No conflicts of interest known.
Notes	Wright 2012 supervised this PhD research. Unpublished data were requested and provided by the author. The thesis has now been published. **Methodological assessment** No concerns

Filia 2012

Study characteristics	

Filia 2012 *(Continued)*

Country	Australia
Study aim	Provides an illustrative case example of a woman with bipolar affective disorder who is motivated to stop smoking despite concerns about weight gain and relapse to depression
Participants	n = 1; age = 63 years; female; diagnosis of bipolar affective disorder
Interventions	Multicomponent CVD risk reduction intervention over 38 weeks - psychosocial intervention and combination nicotine replacement therapy
Methods of data collection and analysis	Single case study. Narrative summary only
Funding sources for the study/ conflict of interest	Funding for the randomised controlled smoking cessation trial was provided by the Australian National Health and Medical Research Council (NHMRC), while GlaxoSmithKline provided nicotine replacement therapy for the study. "Ms. Sacha Filia has received funding support from Monash University. Professor Amanda Baker reports no competing interests. Associate Professor Jill Williams has received grant support from the National Institutes of Health (NIMH and NIDA) and Pfizer. She is a consultant and advisory board member for Pfizer. Professor Jayashri Kulkarni has received grant support from: Stanley Medical Research Institute, NHMRC, AstraZeneca, Mayne Pharma, Servier, Eli Lilly, Jansen-Cilag, Neurosciences Australia, Department of Human Services (Victoria); has received an honoraria as a speaker for Jansen-Cilag, Lundbeck, AstraZeneca, and Bristol Myers Squib; and is an advisory board member for Jansen-Cilag, Bristol Myer Squib, and Pfizer." (p. 294)
Notes	**Methodological assessment** Moderate concerns

Hensley 2008

Study characteristics	
Country	USA
Study aim	Personal narrative of being bipolar and dealing with obesity
Participants	n = 1; female
Interventions	Weight reduction and healthy lifestyle intervention supported by a dietician
Methods of data collection and analysis	Single case study. Narrative summary only
Funding sources for the study/ conflict of interest	None reported.
Notes	**Methodological assessment** Serious concerns

McCullough 2021

Study characteristics	
Country	UK
Study aim	The main aims of this PhD were to explore perceived, device-measured, and subjectively measured relationships between physical activity, sedentary behaviour, and mood in people living with bipolar disorder.
Participants	n = 15; mean age = 54.8 years (SD = 12.81), range 31 to 72 years; 73% female; DSM-IV diagnosis BDI 80%, BDII 20%
Interventions	No intervention. Perceptions of relationships between physical activity, sedentary behaviour, and mood in bipolar disorder
Methods of data collection and analysis	Semi-structured interviews. Thematic (Braun 2006) and framework analysis (Srivastava 2009)
Funding sources for the study/ conflict of interest	PhD funded by the University of Worcester. No conflicts of interest known.
Notes	**Methodological assessment** No concerns

Murnane 2016

Study characteristics	
Country	USA
Study aim	Mixed-methods exploration of technology design to manage bipolar disorder symptoms including physical activity.
Participants	n = 422 (contributed qualitative data from an online survey of N = 552); mean age not reported; however, the largest category of respondents fell within 35 to 44 years category, age ranged from under 18 to 65 to 74; 83% female; diagnosis BDI 27%, BDII 41%, BD-NOS 17%, cyclothymia 2%, do not know 9%, declined 4%
Interventions	No intervention
Methods of data collection and analysis	Online survey including open-ended questions. Open coding (Lofland 2006) and thematic analysis
Funding sources for the study/ conflict of interest	"ELM is supported by the National Science Foundation Graduate Research Fellowship under Grant No. DGE 1144153. MM work was supported by a Marie Curie Fellowship (Project Number: 302530). The Mueller Trust bequest to Dr David Kupfer provided support for Dr EF's involvement and for Stacy Martin's administrative assistance on this project." (p. 483) Conflict of interest "Authors MM, GG, and EF all have an equity interest in HealthRhythms (healthrhythms.com/), a startup company developing apps for patients with bipolar disorder." (p. 483)
Notes	**Methodological assessment** We recognise some limitations of online survey recruitment, which may be associated with sampling and response bias; however, we identified no serious concerns.

Pereira 2019

Study characteristics	
Country	Brazil
Study aim	To know the barriers and facilitators perceived by people with bipolar disorder for the practice of exercise
Participants	n = 23; mean age = 42.3 (SD = 13.34), range 19 to 66 years; 61% female; DSM-V bipolar disorder diagnosis
Interventions	No intervention. Exploration of barriers and facilitators of regular exercise, exercise history, and perceptions of disease management
Methods of data collection and analysis	Semi-structured interviews. Grounded theory (Corbin 2008)
Funding sources for the study/ conflict of interest	This study received funding from Fundo de Incentivo à Pesquisa e Eventos - Hospital de Clínicas de Porto Alegre (FIPE-HCPA). No conflicts of interest declared.
Notes	**Methodological assessment** No concerns

Suto 2010

Study characteristics	
Country	Canada
Study aim	The overarching aim of the study was to synthesise and critically evaluate self-management strategies used by high-functioning people with BD.
Participants	n = 32; mean age 41.1 years (SD = 13.3); 62.5% female; BDI 78.1%, BDII 21.9%
Interventions	No intervention. Exploration of self-management wellness strategies
Methods of data collection and analysis	Mixed methods: quantitative measures and semi-structured interviews and focus group. Thematic analysis (Braun 2006)
Funding sources for the study/ conflict of interest	This study was funded by the British Columbia Medical Services Foundation. The funding agency had no further role in study design; collection, analysis, and interpretation of data; writing of the report; and the decision to submit the paper for publication. No conflicts of interest declared.
Notes	**Methodological assessment** No concerns

Switsers 2018

Study characteristics	
Country	Belgium
Study aim	The objective of this study was to examine the needs and expectations of adults with BD regarding mHealth apps.
Participants	n = 16; mean age = 42 years (SD = 14), age range 21 to 69; 56% female; health professional BD diagnosis, received or undergoing treatment for BD
Interventions	No intervention. Patient views on self-management, design, and functionality of an mHealth app
Methods of data collection and analysis	Focus groups. Content and thematic analysis (Baarda 2013; Savin-Baden 2013; Vaismoradi 2013)
Funding sources for the study/ conflict of interest	This research is supported by the Flemish Agency for Innovation by Science and Technology (IWT), Grant number IWT 140559. "The authors HVD (Cronos NV) and JFEO (Curio NV) are employed by a company that also designs and develops apps. Curio NV is currently developing an mhealth self-management application that will be partly based on the data gathered in the current study." (p. 8)
Notes	**Methodological assessment** No or minor concerns

Wright 2012

Study characteristics	
Country	UK
Study aim	The aim of the study was to gather data on experiences of the relationship between exercise and BD from people with personal experience of the condition.
Participants	n = 25; mean age = 51 years, age range 24 to 71; 60% female; DSM-IV BDI 84%, BDII 12%, other BD disorders 4%
Interventions	No intervention. Exploration of relationship between exercise and BD
Methods of data collection and analysis	Semi-structured interviews. Interpretative phenomenological analysis, descriptive content analysis, and population-specific thematic analysis
Funding sources for the study/ conflict of interest	"Funding for this study was provided by the University of Exeter MENPHYS network; the MENPHYS network had no further role in the study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication. Dr Sarah Dean's position at the Peninsula College of Medicine and Dentistry, University of Exeter and time on this project is supported through the Peninsula Collaboration for Leadership in Applied Health Research and Care (PenCLAHRC), funded by the National Institute of Health Research, UK." (p. 641) No conflicts of interest declared.
Notes	**Methodological assessment** No concerns

BD: bipolar disorder
BDI: bipolar 1 disorder
BDII: bipolar 2 disorder
BD-NOS: bipolar disorder not otherwise specified
CVD: cardiovascular disease
DSM-IV: Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition
DSM-5: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition
SD: standard deviation

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Goodrich 2010	Wrong study design
Nierenberg 2015	Wrong intervention delivered
Vancampfort 2016	Wrong study design

ADDITIONAL TABLES

Table 1. Assessment of methodological limitations

Study ID	Are the results valid?	A. Was the research design appropriate? B. Was the recruitment strategy appropriate?	Were data collected to address research aims?	Researcher/participant relationship considered?	Ethical issues considered?	Data analysis sufficiently rigorous?	Clear statement of findings?	Valuable research?	Overall assessment of methodological limitations
Bauer 2018	Yes	A. Yes B. Yes	Yes	Yes	Yes	Can't tell	Yes	Yes	No or very minor concerns
Bueno-Antequera 2018	Yes	A. Can't tell B. Can't tell	Can't tell	Can't tell	Can't tell	Can't tell	Can't tell	Yes	Moderate concerns
Chalmers 2020	Yes	A. Yes B. Yes	Yes	Yes	Yes	Yes	Yes	Yes	No concerns
Eden 2022	Yes	A. Yes B. Yes	Yes	Yes	Yes	Yes	Yes	Yes	No concerns
Filia 2012	Yes	A. Yes B. Can't tell	Can't tell	Can't tell	Can't tell	No	No	Yes	Moderate concerns
Hensley 2008	Can't tell	A. Yes B. No	No	Yes	No	No	No	No	Serious concerns
McCullough 2021	Yes	A. Yes B. Yes	Yes	Yes	Yes	Yes	Yes	Yes	No concerns
Pereira 2019	Yes	A. Yes B. Yes	Yes	Can't tell	Yes	Yes	Yes	Yes	No concerns
Suto 2010	Yes	A. Yes B. Yes	Yes	Can't tell	Yes	Yes	Yes	Yes	No concerns
Switsers 2018	Yes	A. Yes	Yes	Can't tell	Yes	Yes	Yes	Yes	No or very minor concerns

Table 1. Assessment of methodological limitations *(Continued)*

		B. Can't tell							
Wright 2012	Yes	A. Yes B. Yes	Yes	Yes	Yes	Yes	Yes	Yes	No concerns

Table 2. Assessment of methodological limitations of questionnaire survey data

Study ID	Was there a clear statement of the research?	A. Was the research design appropriate? B. Was the recruitment strategy appropriate?	Were data collected to address research aims?	Researcher/participant relationship considered?	Ethical issues considered?	Data analysis sufficiently rigorous?	Clear statement of findings?	Valuable research?	Overall assessment of methodological limitations
Murnane 2016*	Yes. Assessed in relation to a questionnaire survey and not a qualitative study.	A. Yes. The research design was assessed as being appropriate for a questionnaire survey that included open-ended questions. B. Yes. Was assessed in relation to a questionnaire survey and not a qualitative study.	Can't tell. Only the qualitative free text data were assessed.	Can't tell. Was assessed in relation to a questionnaire survey and not a qualitative study.	Yes. Was assessed in relation to a questionnaire survey and not a qualitative study.	Yes. Was assessed in relation to the analysis of free text data from a questionnaire survey, which is known to have limitations but can contribute where there are insufficient qualitative studies.	No. Was assessed in relation to a questionnaire survey and not a qualitative study.	Can't tell. Was assessed in relation to a questionnaire survey and not a qualitative study.	Serious concerns. Data extracted from open-ended questions derived from surveys generally have methodological concerns - the questions were fixed and set by the researchers and may be designed to fill gaps in the survey, and may not cover issues of interest to the participant. Data are generally contextually thin and conceptually poor, and therefore typically do not contribute much to the synthesis, but may help confirm findings from qualitative studies.

*Murnane 2016 used a questionnaire survey including open-ended questions that were analysed using qualitative methods. As this was not a qualitative methodology, we assessed the methodological limitations of the qualitative analysis using CASP, but applied only to the analysis of the qualitative free text data.

APPENDICES

Appendix 1. Preliminary search

Ovid MEDLINE® and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily (1946 onwards)

[Population]
1. "bipolar and related disorders"/ or bipolar disorder/
2. (bipolar adj3 (affective or depressi* or disorder? or mania or manic or psychos*)).ti,ab,kf.
3. ((affective or depressive) adj2 psychos*).ti,ab,kf.
4. ((mania or manic) adj2 (depressi* or disorder? or episode? or state?)).ti,ab,kf.
5. (rapid cycling or schizoaffective).ti,ab,kf.
6. (bipolar or mania).ti,kf.
7. mentally ill persons/
8. or/1-7
[Intervention (broad, top level terms)]
9. ((access* or attitude? or barrier? or obstacle? or facilitat* or motivat* or preference? or predict*) adj3 (exercis* or (physical* adj (activit* or fit* or health)) or games or sport?)).ti,ab,kf.
10. *Life Style/ or Healthy Lifestyle/ or *Health Behavior/ or Sedentary Behavior/
11. (health promotion or lifestyle intervention? or (promot* adj2 healthy)).ti,ab,kf,sh.
12. *Motivation/px
13. or/9-12
[Outcome]
14. exp Exercise/
15. Exercise Therapy/
16. Physical Exertion/
17. Physical Fitness/
18. Leisure Activities/
19. exp Recreation/
20. exp Sports/
21. (exercis* or games or sport? or sporting or ((leisure or recreation*) adj activ*)).ti,ab,kf.
22. (running or jogging or hopping or skipping or sprinting or park run? or treadmill? or treadmill?).ti,ab,kf.
23. (hiking or tramping or mountaineer*).ti,ab,kf,hw.
24. (skiing? or snowboarding or snow boarding or iceskat* or ice skat* or skating).ti,ab,kf,hw.
25. bicycling.sh. or (bike? or biking or bicycl* or ((recreational or distance) adj cycling)).ti,ab,kf.
26. (water sports or ((aqua* or water) adj (activit* or fit*)) or swimming or sailing or boating or yachting or canoeing or kayaking or surfing or sailboard* or sail board*).ti,ab,kf,hw.
27. (team game? or football* or rugby or cricket or rounders or baseball or netball or volleyball or tennis or squash or badminton).ti,ab,kf,hw.
28. (physical* adj (activit* or conditioning or training)).ti,ab,kf.
29. ((weight? adj1 (lift* or train*)) or ((strength or resistance) adj training)).ti,ab,kf.
30. exercise movement techniques/ or breathing exercises/ or qigong/ or dance therapy/ or tai ji/ or yoga/ or kinesiology/
31. (qigong or qi gong or ch'i kung or Tai Chi or Taiji or Tai Chi Chuan or Taichi Quan or Taijiquan or Shadowboxing or Shadow Boxing or Tai Chi Chih or T'ai Chi Chuan or yoga or yogic or pilates or kinesiology).ti,ab,kf,ot.
32. ((moderate* or graded) adj2 activit*).ti,ab,kf.
33. (aerobics or keep* fit or fitness training).ti,ab,kf.
34. (walking or walks or pedomet* or fitbit? or fit bit? or ((fitness or activit*) adj track*) or (steps adj2 (count* or track* or monitor*))).ti,ab,kf.
35. (ballet or dance or dancing or salsa or zumba).ti,ab,kf.
36. (gardening or horticultur* or allotment* or ((nature or animal) adj2 therap*)).ti,ab,kf,hw.
37. Fitness Trackers/
38. "Physical Education and Training"/
39. Fitness Centers/
40. (gymnasium? or ((fitness or leisure or wellness) adj (cent* or facility or facilities))).ti,ab,kf.
41. ((activity adj2 (amount* or increas* or level? or measur* or monitor*)) not (drug activity or active drug?)).ti.
42. (health promotion or lifestyle intervention?).ti,ab,kf,sh.
43. or/14-42
44. 8 and 13
45. 8 and 43
46. 44 or 45
47. exp animals/ not humans.sh.
48. (mice or mouse or murine or rat or rats or rodent*).ti,kf.
49. 46 not (47 or 48)

Appendix 2. Main searches

The Medline strategy was evaluated and revised in the scoping work as detailed in the study protocol (McCartan 2020). This revised strategy and translation to other databases are presented in Appendix 2.

All other database search strategies (March 2021)

Database: Ovid MEDLINE(R) ALL <1946 to March 19, 2021>

Searched on 22/03/2021

Search Strategy:

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1 "bipolar and related disorders"/ or bipolar disorder/ (41253)

2 cyclothymic disorder/ (732)

3 Mania/ (44)

4 (bipolar adj3 (affective or depressi* or disorder? or mania or manic or psychos*)).ti,ab,kf. (36675)

5 ((affective or depressive) adj2 psychos*).ti,ab,kf. (3923)

6 ((mania or manic) adj2 (depressi* or disorder? or state?)).ti,ab,kf. (8340)

7 (rapid cycling or schizoaffective).ti,ab,kf. (7106)

8 (bipolar or mania).ti,kf. (33299)

9 or/1-8 (68981)

10 *Mental Disorders/ or Mental Health/ (167119)

11 *mentally ill persons/ (4876)

12 (mental* adj2 (disorder? or health* or ill*)).ti. (82903)

13 anxiety disorders/ or agoraphobia/ or anxiety, separation/ or neurocirculatory asthenia/ or neurotic disorders/ or exp obsessive-compulsive disorder/ or hoarding disorder/ or panic disorder/ or phobia, social/ or mutism/ (75015)

14 *anxiety/ or trichotillomania/ (45183)

15 (anxiety disorder? or ADNOS or agoraphobi* or general* anxi* or GAD or separation anxiety or neurocirculatory asthenia or neurotic disorder? or obsessive compulsive or OCD or hoarding disorder? or panic or phobi* or (social* adj2 (anxi* or fear)) or mute? or mutism or (school adj2 (fear or refusal))).ti,ab,kf. (87600)

16 (anxi* adj2 (adult* or infant? or child* or adolesc* or p?ediatric* or teen* or young* or youth or school? or preschool* or middle age? or old age? or elder* or geriatri* or late* life)).ti,ab,kf. (9459)

17 (anxiety adj5 (autism or autistic)).ti,ab,kf. (1134)

18 anxiety.mp. and (child development disorders, pervasive/ or exp autism spectrum disorder/) (1907)

19 anxiety.ti. (53990)

20 exp phobic disorders/ (11505)

21 (aerophobi* or acrophobi* or arachnophobi* or claustrophobi* or cynophobi* or mysophobi* or ophidiophobi* or (fear adj2 (flying or flights or height? or spider? or snake? or dog? or ((small or restrict*) adj space?) or germ? or bacteri* or contaminat*))).ti,ab,kf. (1436)

22 (dentophobi* or h?emophobi* or trypanophobi* or aichmophobi* or (fear adj2 (dental or dentist? or blood* or injection? or needle?))).ti,ab,kf. (1512)

23 "trauma and stressor related disorders"/ or adjustment disorders/ or stress disorders, traumatic/ or combat disorders/ or psychological trauma/ or stress disorders, post-traumatic/ or stress disorders, traumatic, acute/ (41532)

24 (acute stress or traumatic stress or (stress adj2 disorder?) or adjustment disorder? or combat disorder? or (psychological adj1 trauma*) or (posttrauma* adj1 stress*) or (post trauma* adj1 stress*) or PTSD).ti,ab,kf. (53864)

25 Mood Disorders/ (14688)

26 depression/ or depressive disorder/ or depressive disorder, major/ or dysthymic disorder/ (217995)

27 (depress* adj3 (acute or clinical* or diagnos* or disorder* or major or unipolar or illness or scale* or score* or adult* or infant* or child* or adolesc* or p?ediatric* or teen* or young or youth? or middle age? or old age? or elder* or geriatri* or late* life or patient* or participant* or people or inpatient* or in-patient* or outpatient* or out-patient*)).ab. (169712)

28 (depress* and (Beck* or BDI* or DSM* or (Statistical Manual adj2 Mental Disorders) or Hamilton or HAM-D or HAMD or MADRS or (International Classification adj2 Disease?) or ICD-10 or ICD-9)).ab. (44998)

29 "with depressi*".ab. (29346)

30 dysthymi*.ti,ab,kf. (3209)

31 (depress* or mood).ti,kf. (194675)

32 Seasonal Affective Disorder/ (1225)

33 (seasonal affective disorder* or ((seasonal* or winter) adj3 (depress* or mood* or affective disorder* or affective symptom*)) or SIGH-SAD).ti,ab,kf. (1881)

34 Depressive Disorder, Treatment-Resistant/ (1467)

35 (depress* adj3 (refractor* or resistan* or chronic* or persist* or relaps* or recurr*)).ti,ab,kf. (17703)

36 Depression, Postpartum/ (5898)

37 ((postpartum* or post partum* or postnatal* or post natal* or perinatal* or peri natal* or puerp* or intrapartum* or intra partum* or antepartum* or ante partum* or antenatal* or ante natal* or prenatal* or pre natal*) adj3 (depress* or adjustment disorder* or mood disorder* or affective disorder* or affective symptom*)).ti,ab,kf. (9433)

38 or/10-37 (694244)

39 ((barrier* or obstruct* or hinder* or obstacle* or impede* or impedi* or facilitat* or enabl* or incentiv*) adj5 (exercis* or (physical* adj (activit* or fit* or health)) or games or sport*)).ti,ab,kf. (8301)

40 ((participat* or engag* or take part or took part or taking part or uptake or taking up or take up or join or joins or joining or joined) adj3 (exercis* or (physical* adj (activit* or fit* or health)) or games or sport*)).ti,ab,kf. (19489)

41 ((accept* or access* or attitude? or belief* or believ* or choice? or choos* or chose? or experienc* or motiv* or perception* or perceive* or preference? or predict*) adj5 (exercis* or (physical* adj (activit* or fit* or health)) or games or sport*)).ti,ab,kf. (30077)

42 or/39-41 (51527)

43 (barrier* or obstruct* or hinder* or obstacle* or impede* or impedi* or facilitat* or enabl* or incentiv*).ti. (246098)

44 (participat* or engag* or take part or took part or taking part or uptake or taking up or take up or join or joins or joining or joined).ti. (138407)

45 (accept* or access* or attitude? or belief* or believ* or choice? or choos* or chose? or experienc* or motiv* or perception* or perceive* or preference?).ti. (636774)

46 Life Style/ or Healthy Lifestyle/ or *Health Behavior/ or Sedentary Behavior/ (92474)

47 Motivation/ or motivation.ti,kf. (74624)

48 or/43-47 (1132569)

49 exp Exercise/ (205459)

50 Exercise Therapy/ (42328)

51 Physical Exertion/ (56676)

52 Physical Fitness/ (27887)

53 Leisure Activities/ (8947)

54 exp Recreation/ (215713)

55 exp Sports/ (189327)

56 (exercise or games or sport? or sporting or ((leisure or recreation*) adj activ*)).ti,ab,kf. (364260)

57 (running or jogging or hopping or skipping or sprinting or park run? or treadmill? or treadmill?).ti,ab,kf. (105137)

58 (hiking or tramping or mountaineer*).ti,ab,kf,hw. (3774)

59 (skiing? or snowboarding or snow boarding or iceskat* or ice skat* or skating).ti,ab,kf,hw. (5768)

60 bicycling.sh. or (bike? or biking or bicycl* or ((recreational or distance) adj cycling)).ti,ab,kf. (35050)

61 (water sports or ((aqua* or water) adj (activit* or fit*)) or swimming or sailing or boating or yachting or canoeing or kayaking or surfing or sailboard* or sail board*).ti,ab,kf,hw. (44516)

62 (team game? or football* or rugby or cricket or rounders or baseball or netball or volleyball or tennis or squash or badminton).ti,ab,kf,hw. (30223)

63 (physical adj (activit* or conditioning or training)).ti,ab,kf. (128182)

64 ((weight? adj1 (lift* or train*)) or ((strength or resistance) adj training)).ti,ab,kf. (15740)

65 (boxing or wrestling).ti,ab,kf. (2456)

66 exercise movement techniques/ or breathing exercises/ or qigong/ or dance therapy/ or tai ji/ or yoga/ or kinesiology/ (8950)

67 (qigong or qi gong or ch'i kung or Tai Chi or Taiji or Tai Chi Chuan or Taichi Quan or Taijiquan or Shadowboxing or Shadow Boxing or Tai Chi Chih or T'ai Chi Chuan or yoga or yogic or pilates or kinesiology).ti,ab,kf,ot,hw. (9482)

68 (martial art? or aikido or judo or Jujutsu or Jujitsu or Ju-Jitsu or Karate or Kickboxing or Taekwondo or Tae Kwon Do or Taekwon-Do).ti,ab,kf,ot,hw. (2764)

69 ((moderate* or graded) adj2 activit*).ti,ab,kf. (11986)

70 (aerobics or keep* fit or fitness training).ti,ab,kf. (1235)

71 (walking or walks or pedomet* or fitbit? or fit bit? or ((fitness or activit*) adj track*) or (steps adj2 (count* or track* or monitor*))).ti,ab,kf. (82867)

72 (ballet or dance or dancing or salsa or zumba).ti,ab,kf,hw. (7999)

73 (gardening or horticultur* or allotment* or ((nature or animal) adj2 therap*)).ti,ab,kf,hw. (8284)

74 Fitness Trackers/ (704)

75 "Physical Education and Training"/ (13651)

76 fitness centers/ (583)

77 (gymnasium? or ((fitness or leisure or wellness) adj (cent* or facility or facilities))).ti,ab,kf. (1567)

78 ((activity adj2 (amount* or increas* or level? or measur* or monitor*)) not (drug activity or active drug?)).ti. (12630)

79 (health promotion or lifestyle intervention? or (promot* adj2 health*)).ti,ab,kf,sh. (126032)

80 or/49-79 (917847)

81 9 and (42 or 46 or 47) (577)

82 9 and 80 (1092)

83 81 or 82 (1527)

84 38 and 42 (3681)

85 38 and 48 and 80 (5168)

86 84 or 85 (7892)

87 83 or 86 (9301)

88 interview:.mp. (410486)

89 experience:.mp. (1134795)

90 qualitative.tw. (243942)

91 88 or 89 or 90 (1584319)

92 exp qualitative research/ (61165)

93 91 or 92 (1589463)

94 87 and 93 (2674)

95 Focus Groups/ (31531)

96 Focus group*.ti,ab,kf. (50352)

97 feasibility studies/ (71855)

98 pilot projects/ (127563)

99 ((feasib* or pilot or exploratory) adj2 (study or studies or project*)).ti,ab,kf. (151113)

100 Program Evaluation/ (64546)

101 process evaluation*.ti,ab,kf. (4268)

102 Cross-Sectional Studies/ (357422)

103 (cross sectional adj (study or studies)).ti,ab,kf. (185623)

104 ((thematic* or theme* or narrative) adj2 analys*).ti,ab,kf. (34662)

105 ((open or open-ended) adj question*).ti,ab,kf. (10480)

106 or/95-105 (816465)

107 87 and 106 (2220)

108 (mixed method* or multimethod* or multi-method* or multi method*).mp. (29597)

109 realist synthes*.ti,ab,kf. (265)

110 (meta-synthes* or metasynthes*).ti,ab,kf. (1442)

111 (meta-ethnograph* or metaethnograph*).ti,ab,kf. (635)

112 (meta-study or metastudy).ti,ab,kf. (120)

113 realist review*.ti,ab,kf. (407)

114 narrative review*.ti,ab,kf. (13762)

115 or/108-114 (45627)

116 87 and 115 (168)

117 94 or 107 or 116 (4135)

118 (mice or mouse or murine or rat or rats or rodent*).ti,kf. (1492597)

119 117 not 118 (4111)

Database: Embase <1974 to 2021 March 19>

Due to the large Embase search yield and because the team did not expect to find any studies unique to the Embase search, the CCMD IS amended the Embase search to address specificity.

Searched on: 22/03/2021

Search Strategy:

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1 exp bipolar disorder/ (66179)

2 schizoaffective psychosis/ (10764)

3 exp mania/ (77858)

4 (bipolar adj3 (affective or depressi* or disorder? or mania or manic or psychos*)).ti,ab,kw. (57431)

5 ((affective or depressive) adj2 psychos*).ti,ab,kw. (3976)

6 ((mania or manic) adj2 (depressi* or disorder? or state?)).ti,ab,kw. (10297)

7 (rapid cycling or schizoaffective).ti,ab,kw. (10682)

8 (bipolar or mania).ti,kw. (50343)

9 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 (110884)

10 *mental disease/ (98809)

11 mental health/ (150355)

12 (mental* adj2 (disorder? or health* or ill*)).ti. (91380)

13 10 or 11 or 12 (274912)

14 anxiety disorder/ or anxiety neurosis/ or generalized anxiety disorder/ or "mixed anxiety and depression"/ or exp obsessive compulsive disorder/ or panic/ or exp phobia/ or posttraumatic stress disorder/ or separation anxiety/ (211396)

15 exp mutism/ (2937)

16 *anxiety/ (55402)

17 trichotillomania/ (2354)

18 (anxiety disorder? or ADNOS or agoraphobi* or general* anxi* or GAD or separation anxiety or neurocirculatory asthenia or neurotic disorder? or obsessive compulsive or OCD or hoarding disorder? or panic or phobi* or (social* adj2 (anxi* or fear)) or mute? or mutism or (school adj2 (fear or refusal))).ti,ab,kw. (120438)

19 (anxi* adj2 (adult* or infant? or child* or adolesc* or p?ediatric* or teen* or young* or youth or school? or preschool* or middle age? or old age? or elder* or geriatri* or late* life)).ti,ab,kw. (12347)

20 (anxiety adj5 (autism or autistic)).ti,ab,kw. (1607)

21 anxiety.mp. (391654)

22 exp autism/ (75008)

23 21 and 22 (7223)

24 anxiety.ti. (67522)

25 (aerophobi* or acrophobi* or arachnophobi* or claustrophobi* or cynophobi* or mysophobi* or ophidiophobi* or (fear adj2 (flying or flights or height? or spider? or snake? or dog? or ((small or restrict*) adj space?) or germ? or bacteri* or contaminat*))).ti,ab,kw. (2184)

26 (dentophobi* or h?emophobi* or trypanophobi* or aichmophobi* or (fear adj2 (dental or dentist? or blood* or injection? or needle?))).ti,ab,kw. (1846)

27 adjustment disorder/ (3979)

28 acute stress/ (5769)

29 psychotrauma/ (9270)

30 (acute stress or traumatic stress or (stress adj2 disorder?) or adjustment disorder? or combat disorder? or (psychological adj1 trauma*) or (posttrauma* adj1 stress*) or (post trauma* adj1 stress*) or PTSD).ti,ab,kw. (70914)

31 mood disorder/ (45026)

32 exp depression/ (499518)

33 (depress* adj3 (acute or clinical* or diagnos* or disorder* or major or unipolar or illness or scale* or score* or adult* or infant* or child* or adolesc* or p?ediatric* or teen* or young or youth? or middle age? or old age? or elder* or geriatri* or late* life or patient* or participant* or people or inpatient* or in-patient* or outpatient* or out-patient*)).ab. (244614)

34 (depress* and (Beck* or BDI* or DSM* or (Statistical Manual adj2 Mental Disorders) or Hamilton or HAM-D or HAMD or MADRS or (International Classification adj2 Disease?) or ICD-10 or ICD-9)).ab. (71456)

35 "with depressi*".ab. (41682)

36 dysthymi*.ti,ab,kw. (4233)

37 (depress* or mood).ti,kw. (264621)

38 (seasonal affective disorder* or ((seasonal* or winter) adj3 (depress* or mood* or affective disorder* or affective symptom*)) or SIGH-SAD).ti,ab,kw. (2386)

39 (depress* adj3 (refractor* or resistan* or chronic* or persist* or relaps* or recurr*)).ti,ab,kw. (25201)

40 ((postpartum* or post partum* or postnatal* or post natal* or perinatal* or peri natal* or puerp* or intrapartum* or intra partum* or antepartum* or ante partum* or antenatal* or ante natal* or prenatal* or pre natal*) adj3 (depress* or adjustment disorder* or mood disorder* or affective disorder* or affective symptom*)).ti,ab,kw. (13077)

41 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 (1046052)

42 ((barrier* or obstruct* or hinder* or obstacle* or impede* or impedi* or facilitat* or enabl* or incentiv*) adj5 (exercis* or (physical* adj (activit* or fit* or health)) or games or sport*)).ti,ab,kw. (11396)

43 ((participat* or engag* or take part or took part or taking part or uptake or taking up or take up or join or joins or joining or joined) adj3 (exercis* or (physical* adj (activit* or fit* or health)) or games or sport*)).ti,ab,kw. (25490)

44 ((accept* or access* or attitude? or belief* or believ* or choice? or choos* or chose? or experienc* or motiv* or perception* or perceive* or preference? or predict*) adj5 (exercis* or (physical* adj (activit* or fit* or health)) or games or sport*)).ti,ab,kw. (40577)

45 42 or 43 or 44 (68961)

46 (barrier* or obstruct* or hinder* or obstacle* or impede* or impedi* or facilitat* or enabl* or incentiv*).ti. (295852)

47 (participat* or engag* or take part or took part or taking part or uptake or taking up or take up or join or joins or joining or joined).ti. (156708)

48 (accept* or access* or attitude? or belief* or believ* or choice? or choos* or chose? or experienc* or motiv* or perception* or perceive* or preference?).ti. (781762)

49 exp lifestyle/ (138244)

50 *health behavior/ (25428)

51 motivation/ (107803)

52 motivation.ti,kw. (17643)

53 46 or 47 or 48 or 49 or 50 or 51 or 52 (1435333)

54 exp exercise/ (360385)

55 exp kinesiotherapy/ (82976)

56 fitness/ (38081)

57 exp recreation/ (80745)

58 exp sport/ (174302)

59 exp physical activity/ (447321)

60 (exercise or games or sport? or sporting or ((leisure or recreation*) adj activ*)).ti,ab,kw. (487431)

61 (running or jogging or hopping or skipping or sprinting or park run? or treadmill? or treadmill?).ti,ab,kw. (131797)

62 (hiking or tramping or mountaineer*).ti,ab,kw,hw. (4012)

63 (skiing? or snowboarding or snow boarding or iceskat* or ice skat* or skating).ti,ab,kw,hw. (6501)

64 bicycling.sh. or (bike? or biking or bicycl* or ((recreational or distance) adj cycling)).ti,ab,kw. (37109)

65 (water sports or ((aqua* or water) adj (activit* or fit*)) or swimming or sailing or boating or yachting or canoeing or kayaking or surfing or sailboard* or sail board*).ti,ab,kw,hw. (53129)

66 (team game? or football* or rugby or cricket or rounders or baseball or netball or volleyball or tennis or squash or badminton).ti,ab,kw,hw. (38538)

67 (physical adj (activit* or conditioning or training)).ti,ab,kw. (177178)

68 ((weight? adj1 (lift* or train*)) or ((strength or resistance) adj training)).ti,ab,kw. (20144)

69 (boxing or wrestling).ti,ab,kw. (2980)

70 dance therapy/ (538)

71 kinesiology/ (2127)

72 (qigong or qi gong or ch'i kung or Tai Chi or Taiji or Tai Chi Chuan or Taichi Quan or Taijiquan or Shadowboxing or Shadow Boxing or Tai Chi Chih or T'ai Chi Chuan or yoga or yogic or pilates or kinesiology).ti,ab,kw,ot,hw. (17491)

73 (martial art? or aikido or judo or Jujutsu or Jujitsu or Ju-Jitsu or Karate or Kickboxing or Taekwondo or Tae Kwon Do or Taekwon-Do).ti,ab,kw,ot,hw. (3234)

74 ((moderate* or graded) adj2 activit*).ti,ab,kw. (17989)

75 (aerobics or keep* fit or fitness training).ti,ab,kw. (1805)

76 (walking or walks or pedomet* or fitbit? or fit bit? or ((fitness or activit*) adj track*) or (steps adj2 (count* or track* or monitor*))).ti,ab,kw. (115360)

77 (ballet or dance or dancing or salsa or zumba).ti,ab,kw,hw. (11441)

78 (gardening or horticultur* or allotment* or ((nature or animal) adj2 therap*)).ti,ab,kw,hw. (10095)

79 exp activity tracker/ (3575)

80 physical education/ (11724)

81 (gymnasium? or ((fitness or leisure or wellness) adj (cent* or facility or facilities))).ti,ab,kw. (2158)

82 ((activity adj2 (amount* or increas* or level? or measur* or monitor*)) not (drug activity or active drug?)).ti. (15816)

83 (health promotion or lifestyle intervention? or (promot* adj2 health*)).ti,ab,kw,sh. (156801)

84 or/54-83 (1405106)

85 9 and (45 or 49 or 50 or 51 or 52) (1639)

86 9 and 84 (3465)

87 85 or 86 (4659)

88 41 and 45 (6398)

89 41 and 53 and 84 (12067)

90 88 or 89 (16635)

91 87 or 90 (20786)

92 interview:.tw. (482409)

93 qualitative.tw. (306444)

94 exp health care organization/ (1589760)

95 92 or 93 or 94 (2186189)

96 exp qualitative research/ (86553)

97 95 or 96 (2194510)

98 91 and 97 (4664)

99 interview/ or semi structured interview/ or structured interview/ or exp telephone interview/ or unstructured interview/ (294050)

100 (focus adj group*).mp. (64065)

101 feasibility study/ (145764)

102 pilot study/ (166142)

103 ((feasib* or pilot or exploratory) adj2 (study or studies or project*)).ti,ab,kw. (219787)

104 exp program evaluation/ (27076)

105 process evaluation*.ti,ab,kw. (5053)

106 cross-sectional study/ (401150)

107 (cross sectional adj (study or studies)).ti,ab,kw. (249231)

108 thematic analysis/ (20197)

109 ((thematic* or theme* or narrative) adj2 analys*).ti,ab,kw. (43881)

110 ((open or open-ended) adj question*).ti,ab,kw. (12815)

111 (mixed method* or multimethod* or multi-method* or multi method*).mp. (35530)

112 realist synthes*.ti,ab,kw. (266)

113 (meta-synthes* or metasynthes*).ti,ab,kw. (1632)

114 (meta-ethnograph* or metaethnograph*).ti,ab,kw. (724)

115 (meta-study or metastudy).ti,ab,kw. (142)

116 realist review*.ti,ab,kw. (429)

117 narrative review*.ti,ab,kw. (14686)

118 or/99-117 (1203372)

119 91 and 118 (4747)

120 98 or 119 (7206)

121 (mice or mouse or murine or rat or rats or rodent*).ti,kw. (1698226)

122 120 not 121 (7199)

123 (conference abstract or "conference review").pt. (4077741)

124 122 and 123 (1411)

125 limit 124 to yr="2018 -Current" (428)

126 122 not 123 (5788)

127 limit 126 to (article-in-press status or in-process status) (213)

128 126 not 127 (5575)

129 limit 128 to exclude medline journals (740)

130 125 or 127 or 129 (953)

Database: APA PsycInfo <1806 to March Week 3 2021>

Searched on 21/03/2021

Search Strategy:

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1 bipolar disorder/ or bipolar i disorder/ or bipolar ii disorder/ or cyclothymic disorder/ or exp mania/ (31391)

2 schizoaffective disorder/ (3156)

3 (bipolar adj3 (affective or depressi* or disorder? or mania or manic or psychos*)).ti,ab,id. (34951)

4 ((affective or depressive) adj2 psychos*).ti,ab,id. (3829)

5 ((mania or manic) adj2 (depressi* or disorder? or state?)).ti,ab,id. (9599)

6 (rapid cycling or schizoaffective).ti,ab,id. (8052)

7 (bipolar or mania).ti,id. (29910)

8 or/1-7 (52120)

9 mental disorders/ (87049)

10 mental health/ (70005)

11 (mental* adj2 (disorder? or health* or ill*)).ti. (80944)

12 anxiety disorders/ or generalized anxiety disorder/ or exp obsessive compulsive disorder/ or panic attack/ or panic disorder/ or exp phobias/ or separation anxiety disorder/ or trichotillomania/ (53586)

13 *anxiety/ or death anxiety/ (47735)

14 elective mutism/ (509)

15 (anxiety disorder? or ADNOS or agoraphobi* or general* anxi* or GAD or separation anxiety or neurocirculatory asthenia or neurotic disorder? or obsessive compulsive or OCD or hoarding disorder? or panic or phobi* or (social* adj2 (anxi* or fear)) or mute? or mutism or (school adj2 (fear or refusal))).ti,ab,id. (92045)

16 (anxi* adj2 (adult* or infant? or child* or adolesc* or p?ediatric* or teen* or young* or youth or school? or preschool* or middle age? or old age? or elder* or geriatri* or late* life)).ti,ab,id. (12736)

17 (anxiety adj5 (autism or autistic)).ti,ab,id. (1039)

18 anxiety.mp. and exp autism spectrum disorders/ (2767)

19 anxiety.ti. (56441)

20 (aerophobi* or acrophobi* or arachnophobi* or claustrophobi* or cynophobi* or mysophobi* or ophidiophobi* or (fear adj2 (flying or flights or height? or spider? or snake? or dog? or ((small or restrict*) adj space?) or germ? or bacteri* or contaminat*))).ti,ab,id. (1646)

21 (dentophobi* or h?emophobi* or trypanophobi* or aichmophobi* or (fear adj2 (dental or dentist? or blood* or injection? or needle?))).ti,ab,id. (409)

22 "stress and trauma related disorders"/ or acute stress disorder/ or adjustment disorders/ or exp attachment disorders/ or exp posttraumatic stress disorder/ or posttraumatic stress/ (36385)

23 (acute stress or traumatic stress or (stress adj2 disorder?) or adjustment disorder? or combat disorder? or (psychological adj1 trauma*) or (posttrauma* adj1 stress*) or (post trauma* adj1 stress*) or PTSD).ti,ab,id. (58333)

24 *affective disorders/ or major depression/ or anaclitic depression/ or dysthymic disorder/ or endogenous depression/ or late life depression/ or reactive depression/ or atypical depression/ or *"depression (emotion)"/ or neurosis/ (165028)

25 (depress* adj3 (acute or clinical* or diagnos* or disorder* or major or unipolar or illness or scale* or score* or adult* or infant* or child* or adolesc* or p?ediatric* or teen* or young or youth? or middle age? or old age? or elder* or geriatri* or late* life or patient* or participant* or people or inpatient* or in-patient* or outpatient* or out-patient*)).ab. (148555)

26 (depress* and (Beck* or BDI* or DSM* or (Statistical Manual adj2 Mental Disorders) or Hamilton or HAM-D or HAMD or MADRS or (International Classification adj2 Disease?) or ICD-10 or ICD-9)).ab. (42475)

27 "with depressi*".ab. (24824)

28 dysthymi*.ti,ab,id. (3877)

29 (depress* or mood).ti,id. (189953)

30 seasonal affective disorder/ (1089)

31 (seasonal affective disorder* or ((seasonal* or winter) adj3 (depress* or mood* or affective disorder* or affective symptom*)) or SIGH-SAD).ti,ab,id. (1666)

32 recurrent depression/ or treatment resistant depression/ (3382)

33 (depress* adj3 (refractor* or resistan* or chronic* or persist* or relaps* or recurr*)).ti,ab,id. (15156)

34 postpartum depression/ (5007)

35 ((postpartum* or post partum* or postnatal* or post natal* or perinatal* or peri natal* or puerp* or intrapartum* or intra partum* or antepartum* or ante partum* or antenatal* or ante natal* or prenatal* or pre natal*) adj3 (depress* or adjustment disorder* or mood disorder* or affective disorder* or affective symptom*)).ti,ab,id. (7141)

36 or/9-35 (559157)

37 ((barrier* or obstruct* or hinder* or obstacle* or impede* or impedi* or facilitat$ or enabl$ or incentiv*) adj5 (exercis* or (physical* adj (activit* or fit* or health)) or games or sport*)).ti,ab,id. (3732)

38 ((participat* or engag* or take part or took part or taking part or uptake or taking up or take up or join or joins or joining or joined) adj3 (exercis* or (physical* adj (activit* or fit* or health)) or games or sport*)).ti,ab,id. (10073)

39 ((accept* or access* or attitude? or belief* or believ* or choice? or choos* or chose? or experienc* or motiv* or perception* or perceive* or preference? or predict*) adj5 (exercis* or (physical* adj (activit* or fit* or health)) or games or sport*)).ti,ab,id. (22664)

40 or/37-39 (31540)

41 (barrier* or obstruct* or hinder* or obstacle* or impede* or impedi* or facilitat$ or enabl$ or incentiv*).ti. (38974)

42 (participat* or engag* or take part or took part or taking part or uptake or taking up or take up or join or joins or joining or joined).ti. (47614)

43 (accept* or access* or attitude? or belief* or believ* or choice? or choos* or chose? or experienc* or motiv* or perception* or perceive* or preference?).ti. (423977)

44 *lifestyle/ or active living/ or lifestyle changes/ (9199)

45 health behavior/ (28910)

46 sedentary behavior/ (1777)

47 motivation/ (54926)

48 motivation.ti,id. (48588)

49 or/41-48 (563058)

50 exp exercise/ (27576)

51 physical education/ or physical fitness/ (8930)

52 leisure time/ (6356)

53 exp recreation/ (68690)

54 exp sports/ (35378)

55 (exercise or games or sport? or sporting or ((leisure or recreation*) adj activ*)).ti,ab,id. (112561)

56 (running or jogging or hopping or skipping or sprinting or park run? or treadmill? or treadmill?).ti,ab,id. (20751)

57 (hiking or tramping or mountaineer*).ti,ab,id,hw. (379)

58 (skiing? or snowboarding or snow boarding or iceskat* or ice skat* or skating).ti,ab,id,hw. (595)

59 bicycling.sh. or (bike? or biking or bicycl* or ((recreational or distance) adj cycling)).ti,ab,id. (3064)

60 (water sports or ((aqua* or water) adj (activit* or fit*)) or swimming or sailing or boating or yachting or canoeing or kayaking or surfing or sailboard* or sail board*).ti,ab,id,hw. (7347)

61 (team game? or football* or rugby or cricket or rounders or baseball or netball or volleyball or tennis or squash or badminton).ti,ab,id,hw. (9992)

62 (physical adj (activit* or conditioning or training)).ti,ab,id. (38404)

63 ((weight? adj1 (lift* or train*)) or ((strength or resistance) adj training)).ti,ab,id. (2102)

64 (boxing or wrestling).ti,ab,id. (1265)

65 dance therapy/ (1224)

66 kinesiology/ (96)

67 (qigong or qi gong or ch'i kung or Tai Chi or Taiji or Tai Chi Chuan or Taichi Quan or Taijiquan or Shadowboxing or Shadow Boxing or Tai Chi Chih or T'ai Chi Chuan or yoga or yogic or pilates or kinesiology).ti,ab,id,ot,hw. (4289)

68 (martial art? or aikido or judo or Jujutsu or Jujitsu or Ju-Jitsu or Karate or Kickboxing or Taekwondo or Tae Kwon Do or Taekwon-Do).ti,ab,id,ot,hw. (1225)

69 ((moderate* or graded) adj2 activit*).ti,ab,id. (1316)

70 (aerobics or keep* fit or fitness training).ti,ab,id. (505)

71 (walking or walks or pedomet* or fitbit? or fit bit? or ((fitness or activit*) adj track*) or (steps adj2 (count* or track* or monitor*))).ti,ab,id. (18685)

72 (ballet or dance or dancing or salsa or zumba).ti,ab,id,hw. (7972)

73 (gardening or horticultur* or allotment* or ((nature or animal) adj2 therap*)).ti,ab,id,hw. (2974)

74 (gymnasium? or ((fitness or leisure or wellness) adj (cent* or facility or facilities))).ti,ab,id. (981)

75 ((activity adj2 (amount* or increas* or level? or measur* or monitor*)) not (drug activity or active drug?)).ti. (2471)

76 (health promotion or lifestyle intervention? or (promot* adj2 health*)).ti,ab,id,sh. (42481)

77 or/50-76 (261973)

78 8 and 40 (99)

79 44 or 45 or 46 or 47 or 48 (111378)

80 8 and 79 (279)

81 8 and 77 (865)

82 78 or 80 or 81 (1099)

83 36 and 40 (3457)

84 36 and 49 and 77 (3478)

85 83 or 84 (6123)

86 82 or 85 (7116)

87 experience*.mp. (704650)

88 interview*.tw. (343100)

89 qualitative*.tw. (189719)

90 87 or 88 or 89 (1000072)

91 exp qualitative methods/ (16777)

92 qualitative measures/ (84)

93 90 or 91 or 92 (1001516)

94 86 and 93 (2572)

95 Qualitative Study.md. (246879)

96 (interview or focus group).md. (286944)

97 exp focus group/ (927)

98 interviews/ or semi-structured interview/ or exp interviewing/ (14784)

99 focus group*.ti,ab,id. (37737)

100 ((feasib* or pilot or exploratory) adj2 (study or studies or project*)).ti,ab,id. (54934)

101 exp program evaluation/ (20841)

102 process evaluation*.ti,ab,id. (1838)

103 (cross sectional adj (study or studies)).ti,ab,id. (29555)

104 exp thematic analysis/ (1208)

105 narrative analysis/ (852)

106 ((thematic* or theme*or narrative) adj2 analys*).ti,ab,id. (20064)

107 ((open or open-ended) adj question*).ti,ab,id. (3464)

108 or/95-107 (501970)

109 86 and 108 (1568)

110 (mixed method$ or multimethod$ or multi-method$ or multi method$).mp. (32996)

111 realist synthes$.ti,ab,id. (93)

112 (meta-synthes$ or metasynthes$).ti,ab,id. (922)

113 (meta-ethnograph$ or metaethnograph$).ti,ab,id. (387)

114 (meta-study or metastudy).ti,ab,id. (98)

115 realist review$.ti,ab,id. (86)

116 narrative review*.ti,ab,id. (2699)

117 or/110-116 (36983)

118 86 and 117 (108)

119 94 or 109 or 118 (3278)

120 (mice or mouse or murine or rat or rats or rodent*).ti. (123583)

121 119 not 120 (3262)

Cochrane Library

via Wiley

Issue 3 of 12, March 2021

Searched on 21/03/2021

#1 MeSH descriptor: [Bipolar and Related Disorders] explode all trees 2710

#2 MeSH descriptor: [Cyclothymic Disorder] this term only 13

#3 MeSH descriptor: [Mania] this term only 3

#4 (bipolar near/3 (affective or depressi* or disorder? or mania or manic or psychos*)):ti,ab,kw 6748

#5 ((affective or depressive) near/2 psychos*):ti,ab,kw 310

#6 ((mania or manic) near/2 (depressi* or disorder? or state?)):ti,ab,kw 1057

#7 ((rapid next cycling) or schizoaffective):ti,ab,kw 2158

#8 (bipolar or mania):ti,kw 7112

#9 {OR #1-#8} 9991

#10 MeSH descriptor: [Mental Disorders] this term only 3785

#11 MeSH descriptor: [Mental Health] this term only 1565

#12 MeSH descriptor: [Mentally Ill Persons] this term only 54

#13 (mental* near/2 (disorder? or health* or ill*)):ti,ab,kw 31471

#14 MeSH descriptor: [Anxiety Disorders] explode all trees 7042

#15 MeSH descriptor: [Mutism] this term only 18

#16 MeSH descriptor: [Anxiety] this term only 7610

#17 MeSH descriptor: [Trichotillomania] explode all trees 75

#18 ((anxiety next disorder?) or ADNOS or agoraphobi* or (general* next anxi*) or GAD or (separation next anxiety) or (neurocirculatory next asthenia) or (neurotic next disorder?) or(obsessive next compulsive) or OCD or (hoarding next disorder?) or panic or phobi* or (social* near/2 (anxi* or fear)) or mute? or mutism or (school near/2 (fear or refusal))):ti,ab,kw 19525

#19 (anxi* near/2 (adult* or infant? or child* or adolesc* or p?ediatric* or teen* or young* or youth or school? or preschool* or middle age? or old age? or elder* or geriatri* or late* life)):ti,ab,kw 11077

#20 (anxiety near/5 (autism or autistic)):ti,ab,kw 198

#21 anxiety 55451

#22 MeSH descriptor: [Child Development Disorders, Pervasive] this term only 504

#23 MeSH descriptor: [Autistic Disorder] explode all trees 1036

#24 #22 or #23 1271

#25 #21 and #24 111

#26 anxiety:ti 13524

#27 (aerophobi* or acrophobi* or arachnophobi* or claustrophobi* or cynophobi* or mysophobi* or ophidiophobi* or (fear near/2 (flying or flights or height? or spider? or snake? or dog? or ((small or restrict*) adj space?) or germ? or bacteri* or contaminat*))):ti,ab,kw 422

#28 (dentophobi* or h?emophobi* or trypanophobi* or aichmophobi* or (fear near/2 (dental or dentist? or blood* or injection? or needle?))):ti,ab,kw 278

#29 MeSH descriptor: [Trauma and Stressor Related Disorders] this term only 8

#30 MeSH descriptor: [Adjustment Disorders] this term only 247

#31 MeSH descriptor: [Stress Disorders, Traumatic] this term only 753

#32 MeSH descriptor: [Combat Disorders] this term only 130

#33 MeSH descriptor: [Psychological Trauma] this term only 86

#34 MeSH descriptor: [Stress Disorders, Post-Traumatic] this term only 2683

#35 MeSH descriptor: [Stress Disorders, Traumatic, Acute] this term only 51

#36 ("acute stress" or "traumatic stress" or (stress near/2 disorder?) or (adjustment next disorder?) or (combat next disorder?) or (psychological near/1 trauma*) or (posttrauma* near/1 stress*) or (post trauma* near/1 stress*) or PTSD):ti,ab,kw 8241

#37 MeSH descriptor: [Mood Disorders] this term only 836

#38 MeSH descriptor: [Depression] this term only 12583

#39 MeSH descriptor: [Depressive Disorder] explode all trees 12414

#40 (depress* near/3 (acute or clinical* or diagnos* or disorder* or major or unipolar or illness or scale* or score* or adult* or infant* or child* or adolesc* or p?ediatric* or teen* or young or youth? or (middle next age?) or (old next age?) or elder* or geriatri* or late* life or patient* or participant* or people or inpatient* or in-patient* or outpatient* or out-patient*)):ab 39435

#41 (depress* and (Beck* or BDI* or DSM* or ("Statistical Manual" near/2 Mental Disorders) or Hamilton or HAM-D or HAMD or MADRS or ("International Classification" near/2 Disease?) or ICD-10 or ICD-9)):ab 16976

#42 (with next depressi*):ab 4240

#43 dysthymi*:ti,ab,kw 981

#44 (depress* or mood):ti,kw 62058

#45 ((seasonal next affective next disorder*) or ((seasonal* or winter) near/3 (depress* or mood* or (affective next disorder*) or (affective next symptom*))) or SIGH-SAD):ti,ab,kw 455

#46 (depress* near/3 (refractor* or resistan* or chronic* or persist* or relaps* or recurr*)):ti,ab,kw 4960

#47 ((postpartum* or (post next partum*) or postnatal* or (post next natal*) or perinatal* or (peri next natal*) or puerp* or intrapartum* or (intra next partum*) or antepartum* or (ante next partum*) or antenatal* or (ante next natal*) or prenatal* or (pre next natal*)) near/3 (depress* or (adjustment next disorder*) or (mood next disorder*) or (affective next disorder*) or (affective next symptom*))):ti,ab,kw 2210

#48 #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #25 or #26 or #27 or #28 or #29 or #30 or #31 or #32 or #33 or #34 or #35 or #36 or #37 or #38 or #39 or #40 or #41 or #42 or #43 or #44 or #45 or #46 or #47 122526

#49 ((barrier* or obstruct* or hinder* or obstacle* or impede* or impedi* or facilitat* or enabl* or incentiv*) near/5 (exercis* or (physical* next (activit* or fit* or health)) or games or sport*)):ti,ab,kw 2733

#50 ((participat* or engag* or "take part" or "took part" or "taking part" or uptake or "taking up" or "take up" or join or joins or joining or joined) near/3 (exercis* or (physical* next (activit* or fit* or health)) or games or sport*)):ti,ab,kw 4316

#51 ((accept* or access* or attitude? or belief* or believ* or choice? or choos* or chose? or experienc* or motiv* or perception* or perceive* or preference? or predict*) near/5 (exercis* or (physical* next (activit* or fit* or health)) or games or sport*)):ti,ab,kw 7925

#52 {OR #49-#51} 13457

#53 (barrier* or obstruct* or hinder* or obstacle* or impede* or impedi* or facilitat* or enabl* or incentiv*):ti 20934

#54 (participat* or engag* or "take part" or "took part" or "taking part" or uptake or "taking up" or "take up" or join or joins or joining or joined):ti 7721

#55 (accept* or access* or attitude? or belief* or believ* or choice? or choos* or chose? or experienc* or motiv* or perception* or perceive* or preference?):ti 38543

#56 MeSH descriptor: [Life Style] this term only 3326

#57 MeSH descriptor: [Healthy Lifestyle] this term only 273

#58 MeSH descriptor: [Sedentary Behavior] this term only 1145

#59 MeSH descriptor: [Health Behavior] this term only 4149

#60 MeSH descriptor: [Motivation] this term only 4728

#61 motivation:ti,kw 8357

#62 {OR #53-#61} 77461

#63 MeSH descriptor: [Exercise] explode all trees 25067

#64 MeSH descriptor: [Exercise Therapy] this term only 10388

#65 MeSH descriptor: [Physical Exertion] this term only 3868

#66 MeSH descriptor: [Physical Fitness] this term only 2914

#67 MeSH descriptor: [Leisure Activities] this term only 261

#68 MeSH descriptor: [Recreation] explode all trees 17155

#69 MeSH descriptor: [Sports] explode all trees 15818

#70 (exercise or games or sport? or sporting or ((leisure or recreation*) next activ*)):ti,ab,kw 106773

#71 (running or jogging or hopping or skipping or sprinting or park run? or treadmill? or treadmill?):ti,ab,kw 14927

#72 (hiking or tramping or mountaineer*):ti,ab,kw 277

#73 (skiing? or snowboarding or "snow boarding" or iceskat* or (ice next skat*) or skating):ti,ab,kw 309

#74 (bike? or biking or bicycl* or ((recreational or distance) next cycling)):ti,ab,kw 6261

#75 ("water sports" or ((aqua* or water) next (activit* or fit*)) or swimming or sailing or boating or yachting or canoeing or kayaking or surfing or sailboard* or (sail next board*)):ti,ab,kw 1258

#76 ((team next game?) or football* or rugby or cricket or rounders or baseball or netball or volleyball or tennis or squash or badminton):ti,ab,kw 3084

#77 (physical next (activit* or conditioning or training)):ti,ab,kw 34940

#78 ((weight? next (lift* or train*)) or ((strength or resistance) next training)):ti,ab,kw 20163

#79 (boxing or wrestling):ti,ab,kw 214

#80 MeSH descriptor: [Exercise Movement Techniques] explode all trees 2166

#81 MeSH descriptor: [Kinesiology, Applied] this term only 52

#82 (qigong or "qi gong" or "ch'i kung" or "Tai Chi" or Taiji or "Tai Chi Chuan" or "Taichi Quan" or Taijiquan or Shadowboxing or "Shadow Boxing" or "Tai Chi Chih" or "T'ai Chi Chuan" or yoga or yogic or pilates or kinesiology):ti,ab,kw 6285

#83 ((martial next art?) or aikido or judo or Jujutsu or Jujitsu or Ju-Jitsu or Karate or Kickboxing or Taekwondo or "Tae Kwon Do" or Taekwon-Do):ti,ab,kw 376

#84 ((moderate* or graded) near/2 activit*):ti,ab,kw 2430

#85 (aerobics or keep* fit or "fitness training"):ti,ab,kw 708

#86 (walking or walks or pedomet* or fitbit? or (fit next bit?) or ((fitness or activit*) next track*) or (steps near/2 (count* or track* or monitor*))):ti,ab,kw 24432

#87 (ballet or dance or dancing or salsa or zumba):ti,ab,kw 1127

#88 (gardening or horticultur* or allotment* or ((nature or animal) near/2 therap*)):ti,ab,kw 774

#89 MeSH descriptor: [Fitness Trackers] this term only 102

#90 MeSH descriptor: [Physical Education and Training] this term only 1606

#91 MeSH descriptor: [Fitness Centers] this term only 42

#92 (gymnasium? or ((fitness or leisure or wellness) next (cent* or facility or facilities))):ti,ab,kw 468

#93 ((activity near/2 (amount* or increas* or level? or measur* or monitor*)) not (drug activity or active drug?)):ti 1546

#94 ("health promotion" or (lifestyle next intervention?) or (promot* near/2 health*)):ti,ab,kw 17015

#95 {OR #63-#94} 161247

#96 #9 and (#52 or #56 or #57 or #58 or #59 or #60 or #61) 127

#97 #9 and #95 420

#98 #96 or #97 495

#99 #48 and #52 1871

#100 #48 and #62 and #95 1654

#101 #99 or #100 3104

#102 #98 or #101 3533

#103 interview* 39175

#104 experience* 109795

#105 qualitative 16804

#106 MeSH descriptor: [Qualitative Research] explode all trees 1105

#107 MeSH descriptor: [Focus Groups] this term only 627

#108 (Focus next group*):ti,ab,kw 4190

#109 MeSH descriptor: [Feasibility Studies] this term only 6329

#110 MeSH descriptor: [Pilot Projects] this term only 20081

#111 ((feasib* or pilot or exploratory) near/2 (study or studies or project*)):ti,ab,kw 70438

#112 MeSH descriptor: [Program Evaluation] this term only 6194

#113 (process next evaluation*):ti,ab,kw 2552

#114 MeSH descriptor: [Cross-Sectional Studies] this term only 4408

#115 ((cross next sectional) next (study or studies)):ti,ab,kw 9549

#116 ((thematic* or theme* or narrative) near/2 analys*):ti,ab,kw 1942

#117 ((open or (open next ended)) next question*):ti,ab,kw 1083

#118 ((mixed next method*) or multimethod* or (multi next method*)) 3813

#119 (realist next synthes*):ti,ab,kw 0

#120 ((meta next synthes*) or metasynthes*):ti,ab,kw 8

#121 ((meta next ethnograph*) or metaethnograph*):ti,ab,kw 1

#122 ((meta next study) or metastudy):ti,ab,kw 3

#123 (realist next review*):ti,ab,kw 11

#124 (narrative next review*):ti,ab,kw 195

#125 {OR #103-#124} 220772

#126 #102 and #125 1573

CR = 42, CP = 2, CENTRAL = 1527

Science Citation Index

Social Science Citation Index

Via Web of Science, Clarivate

1900- 21032021 (SCI)

1956-21032021 (SSCI)

Searched on 21/03/2021

# 57	4,167	#55 not #56 *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 56	1,876,485	TI=(mice or mouse or murine or rat or rats or rodent*) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 55	4,209	#54 AND #49 *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 54	2,589,943	#53 OR #52 OR #51 OR #50 *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 53	16,502	TS=(realist-synthes* or meta-synthes* or metasynthes* or meta-ethnograph* or metaethnograph* or meta-study or metastudy or ((realist or narrative) NEAR/1 review*)) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*

(Continued)

# 52	44,588	TS=(mixed-method* or multimethod* or multi-method*) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 51	525,844	TS=("focus group" or "focus groups" or ((feasib* or pilot or exploratory) NEAR/2 (study or studies or project*)) or "process evaluation" or "process evaluations" or (cross sectional NEAR/1 (study or studies)) or ((thematic* or theme* or narrative) NEAR/2 analys*) or ((open or open-ended) NEAR/1 question*)) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 50	2,185,026	TS=(interview* or experience* or qualitative*) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 49	11,854	#48 OR #45 *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 48	9,391	#47 OR #46 *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 47	6,808	#42 AND #33 AND #23 *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 46	3,898	#27 AND #23 *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 45	2,639	#44 OR #43 *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 44	1,873	#42 AND #6 *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 43	1,048	#6 AND (#27 OR #31 OR #32) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 42	1,913,763	#41 OR #40 OR #39 OR #38 OR #37 OR #36 OR #35 OR #34 *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 41	76,023	TS=("health promotion" or "lifestyle intervention" or "lifestyle interventions" or (promot* NEAR/2 health*)) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 40	29,180	TI=((activity NEAR/2 (amount* or increas* or level? or measur* or monitor*)) not ("drug activity" or active drug?))

(Continued)

		Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021
# 39	1,618	TS=(gymnasium? or ((fitness or leisure or wellness) NEAR/1 (cent* or facility or facilities))) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 38	264,495	TS=(ballet or dance or dancing or salsa or zumba or gardening or horticultur* or allotment* or ((nature or animal) NEAR/2 therap*) or aerobics or (keep* NEAR/1 fit) or "fitness training" or ((moderate* or graded) NEAR/2 activit*) or walking or walks or pedomet* or fitbit? or fit-bit? or ((fitness or activit*) NEAR/1 track*) or (steps NEAR/2 (count* or track* or monitor*))) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 37	14,154	TS=(qigong or "qi gong" or "ch'i kung" or "Tai Chi" or Taiji or "Tai Chi Chuan" or "Taichi Quan" or Taijiquan or Shadowboxing or "Shadow Boxing" or "Tai Chi Chih" or "T'ai Chi Chuan" or yoga or yogic or pilates or kinesiology or "martial art" or "martial arts" or aikido or judo or Jujutsu or Jujitsu or Ju-Jitsu or Karate or Kickboxing or Taekwondo or "Tae Kwon Do" or Taekwon-Do) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 36	566,035	TS=("water sports" or ((aqua* or water) NEAR/1 (activit* or fit*)) or swimming or sailing or boating or yachting or canoeing or kayaking or surfing or sailboard* or sail-board* or "team game" or team games or football* or rugby or cricket or rounders or baseball or netball or volleyball or tennis or squash or badminton or (physical NEAR/1 (activit* or conditioning or training)) or boxing or wrestling or ((weight? NEAR/1 (lift* or train*)) or ((strength or resistance) NEAR/1 training))) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 35	80,665	TS=(skiing? or snowboarding or snow-boarding or iceskat* or ice-skat* or skating or bike? or biking or bicycl* or ((recreational or distance) adj cycling)) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 34	1,121,377	TS=(exercise or games or sport? or sporting or running or jogging or hopping or skipping or sprinting or park run? or treadmill? or treadmill? or hiking or tramping or mountaineer* ((leisure or recreation*)

(Continued)

		NEAR/1 activ*)) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 33	1,874,704	#32 OR #31 OR #30 OR #29 OR #28 *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 32	166,541	TS=motivation *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 31	201,455	TS=(Life- Style* or Lifestyle* or (Health* NEAR/1 (Behavior* or behaviour*)) or (Sedentary NEAR/1 (Behavior* or behaviour*))) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 30	961,257	TI=(accept* or access* or attitude? or belief* or believ* or choice? or choos* or chose? or experienc* or motiv* or perception* or perceive* or preference?) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 29	254,148	TI=(participat* or engag* or "take part" or "took part" or "taking part" or uptake or "taking up" or "take up" or join or joins or joining or joined) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 28	390,868	TI=(barrier* or obstruct* or hinder* or obstacle* or impede* or impedi* or facilitat* or enabl* or incentiv*) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 27	77,563	#26 OR #25 OR #24 *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 26	48,276	TS=((accept* or access* or attitude? or belief* or believ* or choice? or choos* or chose? or experienc* or motiv* or perception* or perceive* or preference? or predict*) NEAR/5 (exercis* or (physical* NEAR/1 (activit* or fit* or health)) or games or sport*)) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 25	26,486	TS=((participat* or engag* or "take part" or "took part" or "taking part" or uptake or "taking up" or "take up" or join or joins or joining or joined) NEAR/3 (exercis* or (physical* NEAR/1 (activit* or fit* or health)) or games or sport*)) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*

(Continued)

# 24	12,018	TS=((barrier* or obstruct* or hinder* or obstacle* or impede* or impedi* or facilitat* or enabl* or incentiv*) NEAR/5 (exercis* or (physical* NEAR/1 (activit* or fit* or health)) or games or sport*)) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 23	636,853	#22 OR #21 OR #20 OR #19 OR #18 OR #17 OR #16 OR #15 OR #14 OR #13 OR #12 OR #11 OR #10 OR #9 OR #8 OR #7 *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 22	13,519	TS=((postpartum* or post-partum* or postnatal* or post-natal* or perinatal* or peri-natal* or puerp* or intrapartum* or intra-partum* or antepartum* or ante-partum* or antenatal* or ante-natal* or prenatal* or pre-natal*) NEAR/3 (depress* or "adjustment disorder" or "adjustment disorders" or "mood disorder" or "mood disorders" or "affective disorder" or "affective disorders" or "affective symptom" or "affective symptoms")) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 21	23,646	TS=(depress* NEAR/3 (refractor* or resistan* or chronic* or persist* or relaps* or recurr*)) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 20	2,887	TS=("seasonal affective disorder" or "seasonal affective disorders" or ((seasonal* or winter) NEAR/3 (depress* or mood* or "affective disorder" or "affective disorders" or "affective symptom" or "affective symptoms")) or SIGH-SAD) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 19	284,478	TI=(depress* or mood) OR AK=(depress* or mood) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 18	3,165	TS=dysthymi* *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 17	56,664	AB=(with NEAR/1 depressi*) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 16	40,597	AB=(depress* and (Beck* or BDI* or DSM* or ("Statistical Manual" NEAR/2 "Mental Disorders") or Hamilton or HAM-D or HAMD or MADRS or ("International Classification" NEAR/2 Disease?) or ICD-10 or ICD-9))

(Continued)

		Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021
# 15	161,682	AB=(depress* NEAR/3 (acute or clinical* or diagnos* or disorder* or major or unipolar or illness or scale* or score* or adult* or infant* or child* or adolesc* or p?ediatric* or teen* or young or youth? or (middle NEAR/1 age?) or (old NEAR/1 age?) or elder* or geriatri* or (late* NEAR/1 life) or patient* or participant* or people or inpatient* or in-patient* or outpatient* or out-patient*)) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 14	78,860	TS=("acute stress" or "traumatic stress" or (stress NEAR/2 disorder?) or (adjustment NEAR/1 disorder?) or (combat NEAR/1 disorder?) or (psychological NEAR/1 trauma*) or (posttrauma* NEAR/1 stress*) or (post trauma* NEAR/1 stress*) or PTSD) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 13	1,305	TS=(dentophobi* or h?emophobi* or trypanophobi* or aichmophobi* or (fear NEAR/2 (dental or dentist? or blood* or injection? or needle?))) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 12	1,906	TS=(aerophobi* or acrophobi* or arachnophobi* or claustrophobi* or cynophobi* or mysophobi* or ophidiophobi* or (fear NEAR/2 (flying or flights or height? or spider? or snake? or dog? or ((small or restrict*) NEAR/1 space?) or germ? or bacteri* or contaminat*))) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 11	73,755	TI=anxiety *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 10	1,120	TS=(anxiety NEAR/5 (autism or autistic)) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 9	14,950	TS=(anxi* NEAR/2 (adult* or infant? or child* or adolesc* or p?ediatric* or teen* or young* or youth or school? or preschool* or (middle NEAR/1 age?) or (old NEAR/1 age?) or elder* or geriatri* or (late* NEAR/1 life))) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 8	121,272	TS=("anxiety disorder" or "anxiety disorders" or ADNOS or agoraphobi* or (general* NEAR/1 anxi*) or GAD or "separation anxiety" or "neurocirculatory asthenia" or (neurotic NEAR/1 disorder?) or "obsessive compulsive"

(Continued)

		or OCD or (hoarding NEAR/1 disorder?) or panic or phobi* or (social* NEAR/2 (anxi* or fear)) or mute? or mutism or (school NEAR/2 (fear or refusal))) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 7	98,766	TI=(mental* NEAR/2 (disorder? or health* or ill*)) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 6	86,608	#5 OR #4 OR #3 OR #2 OR #1 *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 5	68,112	TI=(bipolar or mania) OR AK=(bipolar or mania) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 4	9,117	TS=("rapid cycling" or schizoaffective) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 3	7,444	TS=((mania or manic) NEAR/2 (depressi* or disorder? or state?)) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 2	3,259	TS=((affective or depressive) NEAR/2 psychos*) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*
# 1	21,149	TS=(bipolar NEAR/3 (affective or depressi* or disorder? or mania or manic or psychos*)) *Indexes=SCI-EXPANDED, SSCI Timespan=1900-2021*

CINAHL Plus

via Ebsco

Inception to 19/03/2021

Searched on: 21/03/2021

#	Query	Results
S1	(MH "Bipolar Disorder+")	12,384
S2	TI (bipolar N3 (affective or depressi* or disorder* or mania or manic or psychos*)) OR AB (bipolar N3 (affective or depressi* or disorder* or mania or manic or psychos*))	11,489
S3	TI ((affective or depressive) N2 psychos*)) OR AB ((affective or depressive) N2 psychos*))	800

(Continued)

S4	TI ((mania or manic) N2 (depressi* or disorder* or state*)) OR AB ((mania or manic) N2 (depressi* or disorder* or state*))	1,457
S5	TI ("rapid cycling" or schizoaffective) OR AB ("rapid cycling" or schizoaffective)	1,880
S6	TI bipolar or mania	9,468
S7	S1 OR S2 OR S3 OR S4 OR S5 OR S6	19,496
S8	(MH "Mental Disorders")	60,805
S9	(MH "Mental Health")	41,640
S10	TI (mental* N2 (disorder* or health* or ill*))	62,748
S11	(MH "Anxiety Disorders+")	46,238
S12	(MH "Separation Anxiety")	721
S13	(MH "Neurotic Disorders")	1,063
S14	(MH "Mutism")	290
S15	(MM "Anxiety+")	22,593
S16	TI (((anxiety N1 disorder*) or ADNOS or agoraphobi* or (general* N1 anxi*) or GAD or “separation anxiety” or “neurocirculatory asthenia” or (neurotic N1 disorder*) or (obsessive N1 compulsive) or OCD or (hoarding N1 disorder*) or panic or phobi* or (social* N2 (anxi* or fear)) or mute* or mutism or (school N2 (fear or refusal)))) OR AB (((anxiety N1 disorder*) or ADNOS or agoraphobi* or (general* N1 anxi*) or GAD or “separation anxiety” or “neurocirculatory asthenia” or (neurotic N1 disorder*) or (obsessive N1 compulsive) or OCD or (hoarding N1 disorder*) or panic or phobi* or (social* N2 (anxi* or fear)) or mute* or mutism or (school N2 (fear or refusal))))	28,081
S17	TI ((anxi* N2 (adult* or infant* or child* or adolesc* or p#ediatric* or teen* or young* or youth or school* or preschool* or (middle N1 age*) or (old N1 age*) or elder* or geriatri* or (late* N1 life)))) OR AB ((anxi* N2 (adult* or infant* or child* or adolesc* or p#ediatric* or teen* or young* or youth or school* or preschool* or (middle N1 age*) or (old N1 age*) or elder* or geriatri* or (late* N1 life))))	7,150
S18	TI ((anxiety N5 (autism or autistic))) OR AB ((anxiety N5 (autism or autistic)))	449
S19	(MH "Child Development Disorders, Pervasive+")	27,524
S20	anxiety	104,670
S21	S19 AND S20	1,255
S22	TI anxiety	24,412
S23	TI ((aerophobi* or acrophobi* or arachnophobi* or claustrophobi* or cynophobi* or mysophobi* or ophidiophobi* or (fear N2 (flying or flights or height* or spider* or snake* or dog* or ((small or restrict*) N1 space*) or germ* or bacteri* or contaminat*)))) OR AB ((aerophobi* or acrophobi* or arachnophobi* or claustrophobi* or cynophobi* or mysophobi* or ophidiophobi* or (fear N2	497

(Continued)

	(flying or flights or height* or spider* or snake* or dog* or ((small or restrict*) N1 space*) or germ* or bacteri* or contaminat*))))	
S24	TI ((dentophobi* or h#emophobi* or trypanophobi* or aichmophobi* or (fear N2 (dental or dentist* or blood* or injection* or needle*)))) OR AB ((dentophobi* or h#emophobi* or trypanophobi* or aichmophobi* or (fear N2 (dental or dentist* or blood* or injection* or needle*))))	748
S25	(MH "Adjustment Disorders")	656
S26	(MH "Psychological Trauma")	1,575
S27	TI (("acute stress" or "traumatic stress" or (stress N2 disorder*) or (adjustment N1 disorder*) or (combat N1disorder*) or (psychological N1 trauma*) or (post-trauma* N1 stress*) or (post trauma* N1 stress*) or PTSD)) OR AB (("acute stress" or "traumatic stress" or (stress N2 disorder*) or (adjustment N1 disorder*) or (combat N1disorder*) or (psychological N1 trauma*) or (posttrauma* N1 stress*) or (post trauma* N1 stress*) or PTSD))	23,550
S28	(MH "Affective Disorders")	7,641
S29	(MH "Depression+")	118,259
S30	AB (depress* N3 (acute or clinical* or diagnos* or disorder* or major or unipolar or illness or scale* or score* or adult* or infant* or child* or adolesc* or p#ediatric* or teen* or young or youth* or (middle N1 age*) or (old N1 age*) or elder* or geriatri* or (late* N1 life) or patient* or participant* or people or inpatient* or in-patient* or outpatient* or out-patient*))	66,699
S31	AB (depress* and (Beck* or BDI* or DSM* or ("Statistical Manual" N2 "Mental Disorders") or Hamilton or HAM-D or HAMD or MADRS or ("International Classification" N2 Disease*) or ICD-10 or ICD-9))	13,774
S32	TI dysthymi* OR AB dysthymi*	826
S33	TI depress* or mood	71,323
S34	TI (("seasonal affective disorder" or "seasonal affective disorders" or ((seasonal* or winter) N3 (depress* or mood* or (affective N1 disorder*) or (affective N1 symptom*))) or SIGH-SAD)) OR AB (("seasonal affective disorder" or "seasonal affective disorders" or ((seasonal* or winter) N3 (depress* or mood* or (affective N1 disorder*) or (affective N1 symptom*))) or SIGH-SAD))	492
S35	(MH "Seasonal Affective Disorder")	646
S36	TI ((depress* N3 (refractor* or resistan* or chronic* or persist* or relaps* or recurr*))) OR AB ((depress* N3 (refractor* or resistan* or chronic* or persist* or relaps* or recurr*)))	6,764
S37	TI (((postpartum* or (post N1 partum*) or postnatal* or (post N1 natal*) or perinatal* or (peri N1 natal*) or puerp* or intrapartum* or (intra N1 partum*) or antepartum* or (ante N1 partum*) or antenatal* or (ante N1 natal*) or prenatal* or (pre N1 natal*)) N3 (depress* or (adjustment N1 disorder*) or (mood N1 disorder*) or (affective N1 disorder*) or (affective N1 symptom*)))) OR AB (((postpartum* or (post N1 partum*) or postnatal* or (post N1 natal*) or perinatal* or (peri N1 natal*) or puerp* or intrapartum* or (intra N1 partum*) or antepartum* or (ante N1 partum*) or antenatal* or (ante N1 natal*) or prena-	6,794

(Continued)

	tal* or (pre N1 natal*)) N3 (depress* or (adjustment N1 disorder*) or (mood N1 disorder*) or (affective N1 disorder*) or (affective N1 symptom*))))	
S38	S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37	329,143
S39	TI (((barrier* or obstruct* or hinder* or obstacle* or impede* or impedi* or facilitat* or enabl* or incentiv*) N5 (exercis* or (physical* N1 (activit* or fit* or health)) or games or sport*))) OR AB (((barrier* or obstruct* or hinder* or obstacle* or impede* or impedi* or facilitat* or enabl* or incentiv*) N5 (exercis* or (physical* N1 (activit* or fit* or health)) or games or sport*)))	5,416
S40	TI (((participat* or engag* or "take part" or "took part" or "taking part" or uptake or "taking up" or "take up" or join or joins or joining or joined) N3 (exercis* or (physical* N1 (activit* or fit* or health)) or games or sport*))) OR AB (((participat* or engag* or "take part" or "took part" or "taking part" or uptake or "taking up" or "take up" or join or joins or joining or joined) N3 (exercis* or (physical* N1 (activit* or fit* or health)) or games or sport*)))	13,198
S41	TI (((accept* or access* or attitude* or belief* or believ* or choice* or choos* or chose* or experienc* or motiv* or perception* or perceive* or preference* or predict*) N5 (exercis* or (physical* N1 (activit* or fit* or health)) or games or sport*))) OR AB (((accept* or access* or attitude* or belief* or believ* or choice* or choos* or chose* or experienc* or motiv* or perception* or perceive* or preference* or predict*) N5 (exercis* or (physical* N1 (activit* or fit* or health)) or games or sport*)))	20,794
S42	S39 OR S40 OR S41	33,990
S43	TI (barrier* or obstruct* or hinder* or obstacle* or impede* or impedi* or facilitat* or enabl* or incentiv*)	69,323
S44	TI (participat* or engag* or "take part" or "took part" or "taking part" or uptake or "taking up" or "take up" or join or joins or joining or joined)	48,926
S45	TI (accept* or access* or attitude* or belief* or believ* or choice* or choos* or chose* or experienc* or motiv* or perception* or perceive* or preference*)	298,872
S46	(MH "Life Style")	27,105
S47	(MM "Health Behavior")	29,763
S48	(MH "Life Style, Sedentary")	8,453
S49	(MH "Motivation")	40,537
S50	TI motivation	4,717
S51	S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50	484,336
S52	(MH "Exercise+")	118,252
S53	(MH "Exertion+")	98,826
S54	(MH "Physical Fitness")	18,127
S55	(MH "Leisure Activities+")	73,340

(Continued)

S56	(MH "Recreation+")	31,322
S57	(MH "Sports+")	83,605
S58	((exercise or games or sport* or sporting or ((leisure or recreation*) N1 activ*))) OR AB ((exercise or games or sport* or sporting or ((leisure or recreation*) N1 activ*)))	277,444
S59	TI ((running or jogging or hopping or skipping or sprinting or park run* or treadmill* or treadmill*)) OR AB ((running or jogging or hopping or skipping or sprinting or park run* or treadmill* or treadmill*))	26,549
S60	TI ((hiking or tramping or mountaineer*)) OR AB ((hiking or tramping or mountaineer*))	541
S61	TI ((skiing* or snowboarding or "snow boarding" or iceskat* or (ice N1 skat*) or skating)) OR AB ((skiing* or snowboarding or "snow boarding" or iceskat* or (ice N1 skat*) or skating))	1,582
S62	TI ((bike* or biking or bicycl* or ((recreational or distance) N1 cycling))) OR AB ((bike* or biking or bicycl* or ((recreational or distance) N1 cycling)))	5,095
S63	TI (("water sports" or ((aqua* or water) N1 (activit* or fit*)) or swimming or sailing or boating or yachting or canoeing or kayaking or surfing or sailboard* or (sail N1 board*))) OR AB (("water sports" or ((aqua* or water) N1 (activit* or fit*)) or swimming or sailing or boating or yachting or canoeing or kayaking or surfing or sailboard* or (sail N1 board*)))	5,868
S64	TI (((team N1 game*) or football* or rugby or cricket or rounders or baseball or netball or volleyball or tennis or squash or badminton)) OR AB (((team N1 game*) or football* or rugby or cricket or rounders or baseball or netball or volleyball or tennis or squash or badminton))	15,406
S65	TI ((physical N1 (activit* or conditioning or training))) OR AB ((physical N1 (activit* or conditioning or training)))	66,140
S66	TI (((weight* N1 (lift* or train*)) or ((strength or resistance) N1 training))) OR AB (((weight* N1 (lift* or train*)) or ((strength or resistance) N1 training)))	9,917
S67	TI ((boxing or wrestling)) OR AB ((boxing or wrestling))	1,093
S68	(MH "Therapeutic Exercise+")	56,899
S69	(MH "Qigong")	726
S70	(MH "Dance Therapy")	847
S71	(MH "Tai Chi") OR (MH "Yoga")	10,527
S72	(MH "Kinesiology")	568
S73	(MH "Fitness Trackers")	219
S74	(MH "Pedometers")	1,421
S75	TI ((qigong or "qi gong" or "ch'i kung" or "Tai Chi" or Taiji or "Tai Chi Chuan" or "Taichi Quan" or Taijiquan or Shadowboxing or "Shadow Boxing" or "Tai Chi Chih" or "T'ai Chi Chuan" or yoga or yogic or pilates or kinesiology)) OR AB	11,238

(Continued)

	((qigong or "qi gong" or "ch'i kung" or "Tai Chi" or Taiji or "Tai Chi Chuan" or "Taichi Quan" or Taijiquan or Shadowboxing or "Shadow Boxing" or "Tai Chi Chih" or "T'ai Chi Chuan" or yoga or yogic or pilates or kinesiology))	
S76	TI (((martial N1 art*) or aikido or judo or Jujutsu or Jujitsu or Ju-Jitsu or Karate or Kickboxing or Taekwondo or "Tae Kwon Do" or Taekwon-Do)) OR AB (((martial N1 art*) or aikido or judo or Jujutsu or Jujitsu or Ju-Jitsu or Karate or Kickboxing or Taekwondo or "Tae Kwon Do" or Taekwon-Do))	1,423
S77	TI (((moderate* or graded) N2 activit*)) OR AB (((moderate* or graded) N2 activit*))	4,315
S78	TI ((aerobics or "keep fit" or "keeping fit" or "fitness training")) OR AB ((aerobics or "keep fit" or "keeping fit" or "fitness training"))	12,999
S79	TI ((walking or walks or pedomet* or fitbit* or "fit bit" or "fit bits" or ((fitness or activit*) N1 track*) or (steps N2 (count* or track* or monitor*)))) OR AB ((walking or walks or pedomet* or fitbit* or "fit bit" or "fit bits" or ((fitness or activit*) N1 track*) or (steps N2 (count* or track* or monitor*))))	43,219
S80	TI ((ballet or dance or dancing or salsa or zumba)) OR AB ((ballet or dance or dancing or salsa or zumba))	5,284
S81	TI ((gardening or horticultur* or allotment* or ((nature or animal) N2 therap*))) OR AB ((gardening or horticultur* or allotment* or ((nature or animal) N2 therap*)))	2,663
S82	(MH "Physical Education and Training")	3,699
S83	(MH "Fitness Centers")	1,747
S84	TI ((gymnasium* or ((fitness or leisure or wellness) N1 (cent* or facility or facilities)))) OR AB ((gymnasium* or ((fitness or leisure or wellness) N1 (cent* or facility or facilities))))	1,301
S85	TI ((activity N2 (amount* or increas* or level* or measur* or monitor*)) not (drug activity or active drug*))	5,578
S86	TI ((health promotion or lifestyle intervention* or (promot* N2 health*))) OR AB ((health promotion or lifestyle intervention* or (promot* N2 health*))) OR SU ((health promotion or lifestyle intervention* or (promot* N2 health*)))	100,733
S87	S52 OR S53 OR S54 OR S55 OR S56 OR S57 OR S58 OR S59 OR S60 OR S61 OR S62 OR S63 OR S64 OR S65 OR S66 OR S67 OR S68 OR S69 OR S70 OR S71 OR S72 OR S73 OR S74 OR S75 OR S76 OR S77 OR S78 OR S79 OR S80 OR S81 OR S82 OR S83 OR S84 OR S85 OR S86	522,775
S88	S7 AND (S42 OR S46 OR S47 OR S48 OR S49 OR S50)	257
S89	S7 AND S87	556
S90	S88 OR S89	738
S91	S38 AND S42	2,809
S92	S38 AND S51 AND S87	4,079
S93	S91 OR S92	6,120

(Continued)

S94	S90 OR S93	6,788
S95	(MH "Attitude+") OR (MH "Interviews+") OR (MH "Qualitative Studies+")	662,541
S96	S94 AND S95	2,138
S97	(MH "Focus Groups")	45,171
S98	TI Focus N1 group* OR AB Focus N1 group*	37,197
S99	(MH "Pilot Studies")	82,412
S100	TI ((feasib* or pilot or exploratory) N2 (study or studies or project*)) OR AB ((feasib* or pilot or exploratory) N2 (study or studies or project*))	73,648
S101	(MH "Program Evaluation")	43,091
S102	TI process N1 evaluation* OR AB process N1 evaluation*	4,566
S103	(MH "Cross Sectional Studies")	203,890
S104	TI ("cross sectional" N1 (study or studies)) OR AB ("cross sectional" N1 (study or studies))	85,229
S105	(MH "Thematic Analysis")	67,515
S106	TI ((thematic* or theme* or narrative) N2 analys*) OR AB ((thematic* or theme* or narrative) N2 analys*)	32,589
S107	(MH "Open-Ended Questionnaires")	5,996
S108	TI ((open or open-ended) N1 question*) OR AB ((open or open-ended) N1 question*)	8,870
S109	S97 OR S98 OR S99 OR S100 OR S101 OR S102 OR S103 OR S104 OR S105 OR S106 OR S107 OR S108	485,280
S110	S94 AND S109	1,959
S111	(MH "Multimethod Studies")	16,241
S112	TI ((mixed N1 method* or multimethod* or multi N1 method*)) OR AB ((mixed N1 method* or multimethod* or multi N1 method*))	21,858
S113	MH "Meta Synthesis"	1,707
S114	TI realist N1 synthes* OR AB realist N1 synthes*	151
S115	TI (meta-synthes* or metasynthes*) OR AB (meta-synthes* or metasynthes*)	1,291
S116	TI (meta-ethnograph* or metaethnograph*) OR AB (meta-ethnograph* or metaethnograph*)	512
S117	TI (meta-study or metastudy) OR AB (meta-study or metastudy)	94
S118	TI realist N1 review* OR AB realist N1 review*	260

(Continued)

S119	TI narrative N1 review* OR AB narrative N1 review*	7,199
S120	S111 OR S112 OR S113 OR S114 OR S115 OR S116 OR S117 OR S118 OR S119	40,718
S121	S94 AND S120	182
S122	S96 OR S110 OR S121	3,233
S123	TI mice or mouse or murine or rat or rats or rodent*	164,605
S124	S122 not S123	3,232

Database: Social Policy and Practice <202101>

Searched on 21/03/2021

Search Strategy:

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1 (bipolar or mania or manic).mp. (490)

2 cyclothymi*.mp. (0)

3 ((affective or depressive) adj2 psychos*).mp. (47)

4 (rapid cycling or schizoaffective).mp. (57)

5 or/1-4 (565)

6 (mental* adj2 (disorder? or health* or ill*)).mp. (39810)

7 anxiety.mp. (4860)

8 (ADNOS or agoraphobi* or general* anxi* or GAD or neurocirculatory asthenia or neurotic disorder? or obsessive compulsive or OCD or hoarding disorder? or panic or phobi* or (social* adj2 (anxi* or fear)) or mute? or mutism or (school adj2 (fear or refusal))).mp. (960)

9 (anxi* adj2 (adult* or infant? or child* or adolesc* or p?ediatric* or teen* or young* or youth or school? or preschool* or middle age? or old age? or elder* or geriatri* or late* life)).mp. (324)

10 trichotillomania.mp. (7)

11 (aerophobi* or acrophobi* or arachnophobi* or claustrophobi* or cynophobi* or mysophobi* or ophidiophobi* or (fear adj2 (flying or flights or height? or spider? or snake? or dog? or ((small or restrict*) adj space?) or germ? or bacteri* or contaminat*))).mp. (8)

12 (dentophobi* or h?emophobi* or trypanophobi* or aichmophobi* or (fear adj2 (dental or dentist? or blood* or injection? or needle?))).mp. (0)

13 (acute stress or traumatic stress or (stress adj2 disorder?) or adjustment disorder? or combat disorder? or (psychological adj1 trauma*) or (posttrauma* adj1 stress*) or (post trauma* adj1 stress*) or PTSD).mp. (2199)

14 (depress* adj3 (acute or clinical* or diagnos* or disorder* or major or unipolar or illness or scale* or score* or adult* or infant* or child* or adolesc* or p?ediatric* or teen* or young or youth? or middle age? or old age? or elder* or geriatri* or late* life or patient* or participant* or people or inpatient* or in-patient* or outpatient* or out-patient*)).mp. (4528)

15 (depress* and (Beck* or BDI* or DSM* or (Statistical Manual adj2 Mental Disorders) or Hamilton or HAM-D or HAMD or MADRS or (International Classification adj2 Disease?) or ICD-10 or ICD-9)).mp. (555)

16 "with depressi*".mp. (1075)

17 dysthymi*.mp. (42)

18 (depress* or mood).ti,de,hw. (7360)

19 (seasonal affective disorder* or ((seasonal* or winter) adj3 (depress* or mood* or affective disorder* or affective symptom*)) or SIGH-SAD).mp. (19)

20 (depress* adj3 (refractor* or resistan* or chronic* or persist* or relaps* or recurr*)).mp. (219)

21 ((postpartum* or post partum* or postnatal* or post natal* or perinatal* or peri natal* or puerp* or intrapartum* or intra partum* or antepartum* or ante partum* or antenatal* or ante natal* or prenatal* or pre natal*) adj3 (depress* or adjustment disorder* or mood disorder* or affective disorder* or affective symptom*)).mp. (386)

22 or/6-21 (48263)

23 ((barrier* or obstruct* or hinder* or obstacle* or impede* or impedi* or facilitat* or enabl* or incentiv*) adj5 (exercis* or (physical* adj (activit* or fit* or health)) or games or sport*)).mp. (211)

24 ((participat* or engag* or take part or took part or taking part or uptake or taking up or take up or join or joins or joining or joined) adj3 (exercis* or (physical* adj (activit* or fit* or health)) or games or sport*)).mp. (611)

25 ((accept* or access* or attitude? or belief* or believ* or choice? or choos* or chose? or experienc* or motiv* or perception* or perceive* or preference? or predict*) adj5 (exercis* or (physical* adj (activit* or fit* or health)) or games or sport*)).mp. (954)

26 23 or 24 or 25 (1539)

27 (barrier* or obstruct* or hinder* or obstacle* or impede* or impedi* or facilitat* or enabl* or incentiv*).ti. (2859)

28 (participat* or engag* or take part or took part or taking part or uptake or taking up or take up or join or joins or joining or joined).ti. (5225)

29 (accept* or access* or attitude? or belief* or believ* or choice? or choos* or chose? or experienc* or motiv* or perception* or perceive* or preference?).ti. (19890)

30 (Life Style* or Lifestyle* or Health Behavio?r* or Sedentary Behavio?r*).mp. (3662)

31 motivation.mp. (2504)

32 27 or 28 or 29 or 30 or 31 (32191)

33 (exercise or games or sport? or sporting or ((leisure or recreation*) adj activ*)).mp. (8698)

34 (running or jogging or hopping or skipping or sprinting or park run? or treadmill? or treadmill?).mp. (1874)

35 (hiking or tramping or mountaineer*).mp. (9)

36 (skiing? or snowboarding or snow boarding or iceskat* or ice skat* or skating).mp. (21)

37 (bike? or biking or bicycl* or ((recreational or distance) adj cycling)).mp. (231)

38 (water sports or ((aqua* or water) adj (activit* or fit*)) or swimming or sailing or boating or yachting or canoeing or kayaking or surfing or sailboard* or sail board*).mp. (287)

39 (team game? or football* or rugby or cricket or rounders or baseball or netball or volleyball or tennis or squash or badminton).mp. (462)

40 (physical adj (activit* or conditioning or training)).mp. (1598)

41 ((weight? adj1 (lift* or train*)) or ((strength or resistance) adj training)).mp. (62)

42 (boxing or wrestling).mp. (48)

43 (qigong or qi gong or ch'i kung or Tai Chi or Taiji or Tai Chi Chuan or Taichi Quan or Taijiquan or Shadowboxing or Shadow Boxing or Tai Chi Chih or T'ai Chi Chuan or yoga or yogic or pilates or kinesiology).mp. (174)

44 (martial art? or aikido or judo or Jujutsu or Jujitsu or Ju-Jitsu or Karate or Kickboxing or Taekwondo or Tae Kwon Do or Taekwon-Do).mp. (20)

45 ((moderate* or graded) adj2 activit*).mp. (39)

46 (aerobics or keep* fit or fitness training).mp. (160)

47 (walking or walks or pedomet* or fitbit? or fit bit? or ((fitness or activit*) adj track*) or (steps adj2 (count* or track* or monitor*))).mp. (1280)

48 (ballet or dance or dancing or salsa or zumba).mp. (432)

49 (gardening or horticultur* or allotment* or ((nature or animal) adj2 therap*)).mp. (639)

50 (gymnasium? or ((fitness or leisure or wellness) adj (cent* or facility or facilities))).mp. (387)

51 (activity adj2 (amount* or increas* or level? or measur* or monitor*)).mp. (626)

52 (health promotion or lifestyle intervention? or (promot* adj2 health*)).mp. (3246)

53 or/33-52 (16516)

54 5 and (26 or 30 or 31) (16)

55 5 and 53 (24)

56 54 or 55 (36)

57 22 and 26 (323)

58 22 and 32 and 53 (445)

59 57 or 58 (695)

60 56 or 59 (726)

61 interview:.mp. (26900)

62 experience:.mp. (49762)

63 qualitative.mp. (13977)

64 61 or 62 or 63 (71277)

65 60 and 64 (297)

66 Focus group*.mp. (5378)

67 ((feasib* or pilot or exploratory) adj2 (study or studies or project*)).mp. (4368)

68 process evaluation*.mp. (193)

69 (cross sectional adj (study or studies)).mp. (729)

70 ((thematic* or theme* or narrative) adj2 analys*).mp. (2268)

71 ((open or open-ended) adj question*).mp. (64)

72 or/66-71 (12159)

73 60 and 72 (82)

74 (mixed method* or multimethod* or multi-method* or multi method*).mp. (1628)

75 realist synthes*.mp. (26)

76 (meta-synthes* or metasynthes*).mp. (103)

77 (meta-ethnograph* or metaethnograph*).mp. (48)

78 (meta-study or metastudy).mp. (2)

79 realist review*.mp. (32)

80 narrative review*.mp. (202)

81 or/74-80 (2004)

82 60 and 81 (15)

83 65 or 73 or 82 (325)

Appendix 3. Data extraction template

Background information					
Author					
Micro context: population (any specific characteristics, perspectives, or subgroups?)					
Micro context: setting (setting, e.g. hospital, private provider, time frame of interest)					
Micro context: place (geographical location, political system, e.g. state-funded health care)					
Meso-context: intervention (description of intervention, recruitment, dose, duration, delivery)					
Macro-context (policy, political issues, social climate or legislation)					
Data collection methods (e.g. focus group, face-to-face interviews, observation)					
Theory of change/logic model					
Data analysis methods (e.g. thematic analysis, grounded theory)					
Relevant quantitative findings					
Purposive sampling category	*Population*	*Diagnosis*	*Methods*	*Intervention*	*Quality*
Participants					
Sample size					

(Continued)

Perspective Service users, carers, service providers, health professionals	*Service users*	*Carers*	*Service providers*	*Health professionals*
Modifying factors *(for each participant category viewpoint: service user, carers, service providers, health professionals)*				
Age				
Gender				
Socio-economic status (SES)				
Ethnicity				
Place of residence				
Occupation				
Education				
Social capital				
Primary diagnosis *(list specific diagnosis)*				
Comorbidity				
Severity				
Length of condition				
Perceived seriousness and susceptibility				
Consideration of future				
Self-identity				
Perceived importance				
Concern for appearance				
Other perceptions of seriousness and susceptibility				
Threats				
Perceived susceptibility: accepting mental health diagnosis and physical health needs				
Perceived severity of mental health symptoms				

(Continued)

Perceived physical health limits
Other threats
Expectations
Perceived benefits of physical activity
Perceived barriers to physical activity
Perceived self-efficacy: motivation, self-esteem
Other expectations
Cues to action
Public health messages
Professionals
Support networks
Telemonitoring
Other
Outcomes
Participation in physical activity
Additional themes

Appendix 4. GRADE-CERQual evidence profile

Summarised review finding	Methodological limitations	Coherence	Adequacy	Relevance	Explanation	References
Finding 1. Being psychologically ready to engage in physical activity is important.	**No/very minor concerns**	**No/very minor concerns**	**Moderate concerns** Moderate concerns regarding adequacy because of thin data and small number of studies.	**No/very minor concerns** Two studies directly relevant to the question/context in the review protocol, six studies partially relevant. Six studies directly relevant including men and women. Two studies par-	**High confidence** No/very minor concerns regarding methodological limita-	Bauer 2018; Bueno-Antequera 2018; Chalmers 2020; Filia 2012; Hensley

(Continued)

				tially relevant - women only. The sample was from high-income settings with little evidence of different ethnicities.	tions, coherence, and relevance, and moderate concerns regarding adequacy.	2008; Murnane 2016; Pereira 2019; Wright 2012
Finding 2. The physical health needs of people with bipolar disorder are often not appropriately assessed and addressed. It is important to promote people's understanding of their physical health needs.	**No/very minor concerns**	**Minor concerns** Minor concerns regarding coherence because theoretical basis not discussed.	**Moderate concerns** Moderate concerns regarding adequacy because of thin data and small number of studies.	**No/very minor concerns** One study directly relevant to the question/context in the review protocol, four studies partially relevant. Three studies directly relevant including men and women. Two studies partially relevant - women only. The sample was from high-income settings with little evidence of different ethnicities.	**Moderate confidence** No/very minor concerns regarding methodological limitations, coherence, and relevance, and moderate concerns regarding adequacy.	Bauer 2018; Bueno-Antequera 2018; Chalmers 2020; Filia 2012; Pereira 2019
Finding 3. The impact of other interactions influencing physical activity should be considered.	**Minor concerns** Minor concerns regarding methodological limitations because most of the studies did not collect data to illustrate comorbidities.	**No/very minor concerns**	**Moderate concerns** Moderate concerns regarding adequacy because of thin data and small number of studies.	**No/very minor concerns** One study directly relevant to the question/context in the review protocol, four studies partially relevant. Three studies directly relevant including men and women. Two studies partially relevant - women only. The sample was from high-income settings with little evidence of different ethnicities.	**Moderate confidence** Minor concerns regarding methodological limitations, No/very minor concerns regarding coherence and relevance. Moderate concerns regarding adequacy.	Bueno-Antequera 2018; Chalmers 2020; Filia 2012; Hensley 2008; Pereira 2019
Finding 4. Stigma and shame related to bipolar disorder and physical activity.	**No/very minor concerns** There were some methodological limitations, but these were assessed as not affect-	**No/very minor concerns**	**Moderate concerns** Moderate concerns regarding adequacy because of thin data and small number of studies. The sample was mostly female, from high-income settings with little evidence of different ethnic groups.	**No/very minor concerns** One study directly relevant to the question/context in the review protocol, three studies partially relevant. Three studies directly relevant including men and women. One study partially relevant - women only. The sample was from high-income settings with little evidence of different ethnicities.	**High confidence** No/very minor concerns regarding methodological limitations, coherence, and relevance. Moderate concerns regarding adequacy.	Bauer 2018; Hensley 2008; Murnane 2016; Pereira 2019

(Continued)

	ing the finding.					
Finding 5: Financial constraints of engaging in physical activity.	**No/very minor concerns**	**No/very minor concerns**	**Moderate concerns** Moderate concerns regarding adequacy because of thin data and small number of studies. The sample was mostly female, from high-income settings with little evidence of different ethnic groups.	**No/very minor concerns** Two studies directly relevant to the question/context in the review protocol, six studies partially relevant. Seven studies directly relevant including men and women. One study partially relevant - women only. The sample was from high-income settings with little evidence of different ethnicities.	**High confidence** No/very minor concerns regarding methodological limitations, coherence, and relevance. Moderate concerns regarding adequacy.	Bauer 2018; Bueno-Antequera 2018; Chalmers 2020; Murnane 2016; Pereira 2019; Suto 2010; Switsers 2018; Wright 2012
Finding 6: Practical barriers to regular physical activity include bad weather, lack of access or transport problems, and feeling safe.	**Minor concerns** Minor concerns regarding methodological limitations, some information is missing.	**No/very minor concerns**	**Moderate concerns** Moderate concerns regarding adequacy because of thin data and small number of studies. The sample was mostly female, from high-income settings with little evidence of different ethnic groups.	**No/very minor concerns** One study directly relevant to the question/context in the review protocol, three studies partially relevant. Two studies directly relevant including men and women. Two studies partially relevant - women only. The sample was from high-income settings with little evidence of different ethnicities.	**Moderate confidence** Minor concerns regarding methodological limitations and adequacy. No/very minor concerns regarding coherence and relevance.	Bauer 2018; Bueno-Antequera 2018; Hensley 2008; Pereira 2019
Finding 7. The positive benefits of physical activity.	**No/very minor concerns**	**No/very minor concerns**	**Moderate concerns** Moderate concerns regarding adequacy because of thin data and small number of studies. The sample was mostly female, from high-income settings with little evidence of different ethnic groups.	**No/very minor concerns** Three studies directly relevant to the question/context in the review protocol, six studies partially relevant. Six studies directly relevant including men and women. Three studies partially relevant - women only. The sample was from high-income settings with little evidence of different ethnicities.	**High confidence** No/very minor concerns regarding methodological limitations, coherence, and relevance. Moderate concerns regarding adequacy.	Bueno-Antequera 2018; Chalmers 2020; Eden 2022; Filia 2012; Hensley 2008; Murnane 2016; Pereira 2019; Switsers 2018; Wright 2012
Finding 8. Perceptions about loss of skill or mastery or confidence.	**No/very minor concerns**	**No/very minor concerns**	**Moderate concerns** Moderate concerns regarding adequacy because of thin data and small number of studies. The sample was mostly female, from high-income settings with little evidence	**No/very minor concerns** Two studies directly relevant to the question/context in the review protocol, four studies partially relevant. Four studies directly relevant including men and women. Two studies partially relevant - women only. The sample was from high-income settings with little evidence of different ethnicities.	**High confidence** No/very minor concerns regarding methodological limitations, coherence, and rele-	Bauer 2018; Chalmers 2020; Filia 2012; Hensley 2008; Pereira 2019; Wright 2012

(Continued)

			of different ethnic groups.		vance. Moderate concerns regarding adequacy.	
Finding 9. Taking personal responsibility for being physically active.	**No/very minor concerns**	**No/very minor concerns**	**Moderate concerns** Moderate concerns regarding adequacy because of thin data and small number of studies. The sample was mostly female, from high-income settings with little evidence of different ethnic groups.	**No/very minor concerns** Three studies directly relevant to the question/context in the review protocol, five studies partially relevant. Six studies directly relevant including men and women. Two studies partially relevant - women only. The sample was from high-income settings with little evidence of different ethnicities.	**High confidence** No/very minor concerns regarding methodological limitations, coherence, and relevance. Moderate concerns regarding adequacy.	Bauer 2018; Eden 2022; Filia 2012; Hensley 2008; Murnane 2016; Pereira 2019; Suto 2010; Wright 2012
Finding 10. Clear guidelines are beneficial for initiating and incorporating lifestyle changes.	**Minor concerns** Minor concerns regarding methodological limitations, but these were assessed as not affecting the finding.	**No/very minor concerns** No/very minor concerns regarding coherence because theoretical basis not discussed.	**Moderate concerns** Moderate concerns regarding adequacy because of thin data and small number of studies. The sample was mostly female, from high-income settings with little evidence of different ethnic groups.	**No/very minor concerns** One study directly relevant to the question/context in the review protocol, four studies partially relevant. Three studies directly relevant including men and women. Two studies partially relevant - women only. The sample was from high-income settings with little evidence of different ethnicities.	**Moderate confidence** Minor concerns regarding methodological limitations, no/very minor concerns regarding coherence and relevance, moderate concerns regarding adequacy.	Bauer 2018; Filia 2012; Hensley 2008; Pereira 2019; Suto 2010
Finding 11. Understanding bipolar disorder.	**No/very minor concerns**	**No/very minor concerns**	**Moderate concerns** Moderate concerns regarding adequacy because of thin data and small number of studies. The sample was mostly female, from high-income settings with little evidence of different ethnic groups.	**No/very minor concerns** Three studies directly relevant to the question/context in the review protocol, four studies partially relevant. Seven studies directly relevant including men and women. The sample was from high-income settings with little evidence of different ethnicities.	**High confidence** No/very minor concerns regarding methodological limitations, coherence, and adequacy, minor concerns regarding relevance.	Bauer 2018; Chalmers 2020; Eden 2022; McCullough 2021; Suto 2010; Switsers 2018; Wright 2012
Finding 12. Physical activity should form part of a treatment plan.	**No/very minor concerns**	**Minor concerns** Minor concerns regarding coherence because the-	**Moderate concerns** Moderate concerns regarding adequacy because of thin data and small number of studies. The	**No/very minor concerns** Three studies directly relevant to the question/context in the review protocol, three studies partially relevant. Six studies directly relevant including men and women. The sample was	**Moderate confidence** No/very minor concerns regarding methodological limita-	Bauer 2018; Chalmers 2020; Eden 2022; Pereira 2019; Suto 2010; Wright 2012

(Continued)

		oretical basis not discussed.	sample was mostly female, from high-income settings with little evidence of different ethnic groups.	from high-income settings with little evidence of different ethnicities.	tions and relevance. Minor concerns regarding coherence, and moderate concerns regarding adequacy.	
Finding 13. The enabling role of trained, multidisciplinary professionals.	**No/very minor concerns**	**No/very minor concerns**	**Moderate concerns** Moderate concerns regarding adequacy because of thin data and small number of studies. The sample was mostly female, from high-income settings with little evidence of different ethnic groups.	**No/very minor concerns** Two studies directly relevant to the question/context in the review protocol, five studies partially relevant. Five studies directly relevant including men and women. Two studies partially relevant - women only. The sample was from high-income settings with little evidence of different ethnicities.	**High confidence** No/very minor concerns regarding methodological limitations, coherence, and relevance. Moderate concerns regarding adequacy.	Bauer 2018; Chalmers 2020; Filia 2012; Hensley 2008; Pereira 2019; Suto 2010; Wright 2012
Finding 14. Finding the right support.	**No/very minor concerns**	**No/very minor concerns**	**Moderate concerns** Moderate concerns regarding adequacy because of thin data and small number of studies. The sample was mostly female, from high-income settings with little evidence of different ethnic groups.	**No/very minor concerns** Three studies directly relevant to the question/context in the review protocol, three studies partially relevant. Six studies directly relevant including men and women. The sample was from high-income settings with little evidence of different ethnicities.	**High confidence** No/very minor concerns regarding methodological limitations, coherence, and relevance. Moderate concerns regarding adequacy.	Bauer 2018; Chalmers 2020; Eden 2022; Pereira 2019; Suto 2010; Wright 2012
Finding 15. Monitoring mental health and physical activity.	**No/very minor concerns**	**No/very minor concerns**	**Moderate concerns** Moderate concerns regarding adequacy because of thin data and small number of studies. The sample was mostly female, from high-income settings with little evidence of different ethnic groups.	**No/very minor concerns** Four studies partially relevant to the question/context in the review protocol. Four studies directly relevant including men and women. The sample was from high-income settings with little evidence of different ethnicities.	**High confidence** No/very minor concerns regarding methodological limitations, coherence, and relevance. Moderate concerns about adequacy.	Bauer 2018; Chalmers 2020; Murnane 2016; Suto 2010
Finding 16. Sustainability and finding the right type	**No/very minor concerns**	**No/very minor concerns**	**Moderate concerns** Moderate concerns regarding adequacy because of thin da-	**No/very minor concerns** Three studies directly relevant to the question/context in the review protocol, five studies partially relevant. Seven studies	**High confidence** No/very minor concerns regarding	Bauer 2018; Chalmers 2020; Eden 2022; Hensley 2008; Pereira

(Continued)

of physical activity.			ta and small number of studies. The sample was mostly female, from high-income settings with little evidence of different ethnic groups.	directly relevant including men and women. One study partially relevant - women only. The sample was from high-income settings with little evidence of different ethnicities.	methodological limitations, coherence, and relevance. Moderate concerns about adequacy.	2019; Suto 2010; Switsers 2018; Wright 2012
Finding 17. Finding balance, rhythm, structure, and routine.	**No/very minor concerns**	**No/very minor concerns**	**Moderate concerns** Moderate concerns regarding adequacy because of thin data and small number of studies. The sample was mostly female, from high-income settings with little evidence of different ethnic groups.	**No/very minor concerns** Four studies directly relevant to the question/context in the review protocol, three studies partially relevant. Seven studies directly relevant including men and women. The sample was from high-income settings with little evidence of different ethnicities.	**High confidence** No/very minor concerns regarding methodological limitations, coherence, and relevance. Moderate concerns about adequacy.	Chalmers 2020; Eden 2022; McCullough 2021; Murnane 2016; Pereira 2019; Switsers 2018; Wright 2012
Finding 18. Appropriate coping strategies may support engagement in physical activity and other health-promoting behaviours.	**Minor concerns** Minor concerns regarding methodological limitations because of missing information regarding methods and author reflexivity.	**Moderate concerns** Moderate concerns regarding coherence because the theoretical basis is unclear.	**Moderate concerns** Moderate concerns regarding adequacy because of thin data and small number of studies. The sample was mostly female, from high-income settings with little evidence of different ethnic groups.	**Moderate concerns** Three studies partially relevant to the question/context in the review protocol. One study directly relevant including men and women. Two studies partially relevant - women only. The sample was from high-income settings with little evidence of different ethnicities.	**Low confidence** Minor concerns regarding methodological limitations, moderate concerns regarding coherence, adequacy, and relevance.	Chalmers 2020; Filia 2012; Hensley 2008
Finding 19: Physical activity and connecting to nature.	**No/very minor concerns**	**Minor concerns** Minor concerns regarding coherence because theoretical basis not discussed.	**Moderate concerns** Moderate concerns regarding adequacy because of thin data and small number of studies. The sample was mostly female, from high-income settings with little evidence of different ethnic groups.	**No/very minor concerns** Two studies directly relevant to the question/context in the review protocol, one study partially relevant. Three studies directly relevant including men and women. The sample was from high-income settings with little evidence of different ethnicities.	**Moderate confidence** No/very minor concerns regarding methodological limitations and relevance, minor concerns regarding coherence, and moderate concerns regarding adequacy.	Eden 2022; Suto 2010; Wright 2012

(Continued)

Finding 20. Considerations for designing interventions that promote physical activity for bipolar disorder.	**No/very minor concerns**	**No/very minor concerns**	**Moderate concerns** Moderate concerns regarding adequacy because of thin data and small number of studies. The sample was mostly female, from high-income settings with little evidence of different ethnic groups.	**No/very minor concerns** Two studies directly relevant to the question/context in the review protocol, seven studies partially relevant. Six studies directly relevant including men and women. Three studies partially relevant - women only. The sample was from high-income settings with little evidence of different ethnicities.	**High confidence** No/very minor concerns regarding methodological limitations, coherence, and relevance. Moderate concerns regarding adequacy.	Bauer 2018; Bueno-Antequera 2018; Chalmers 2020; Filia 2012; Hensley 2008; McCullough 2021; Murnane 2016; Pereira 2019; Suto 2010

WHAT'S NEW

Date	Event	Description
13 June 2024	Amended	Author affiliations updated

HISTORY

Protocol first published: Issue 3, 2020
Review first published: Issue 6, 2024

CONTRIBUTIONS OF AUTHORS

CMcC and JY conducted title and abstract screening. PB, GB, GD, CMcC, MT, PW, and JY were responsible for full-text screening. GD, CMcC, and JY performed data extraction. CMcC drafted the findings. GD, CMcC, CW, and PW participated in a discussion about the key findings and consulted with people with lived experience, and JB, PB, RC, GD, JF, SG, MT, CW, and JY provided feedback on the review findings. CMcC and GD drafted the final review.

DECLARATIONS OF INTEREST

Claire J McCartan: no conflicts of interest

Jade Yap: no conflicts of interest

Paul Best: no conflicts of interest

Josefien Breedvelt: no conflicts of interest

Gavin Breslin: no conflicts of interest

Joseph Firth: is supported by a National Institute of Complementary Medicine (NICM) and Blackmores Institute Fellowship.

Mark A Tully: no conflicts of interest

Paul Webb: no conflicts of interest

Chris White: no conflicts of interest

Simon Gilbody: no conflicts of interest

Rachel Churchill: leads and has responsibility for Cochrane Common Mental Disorders, which supported parts of the review process and was largely funded by a grant from the National Institute for Health Research (NIHR) in the UK. RC was not involved in the editorial process for this review.

Gavin Davidson: is employed as the Praxis Chair of Social Care at Queen's University Belfast. This position is partially funded by Praxis Care, a mental health service provider.

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Internal sources

- Queen's University Belfast, UK

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External sources

- Disability Research on Independent Living and Learning (DRILL), UK

  Funding was provided for CMcC's salary for 0.5 days per week over a three-month period to help complete this protocol.
- National Institute of Complementary Medicine (NICM) and Blackmores Institute, Australia

  JF is supported by a NICM-Blackmores Institute Fellowship.
- Praxis Care, UK

  GD's post at Queen's University Belfast is part funded by Praxis Care.

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

While we used the Health Belief Model (HBM) to extract the data and develop the findings, we were unable to use the Template for Intervention Description and Replication (TIDieR) checklist because so few of the studies delivered an intervention.

We did anticipate that we could explore some of the modifying factors identified by the HBM including gender, race, and socio-economic status, but these aspects were not reported uniformly across the studies or at all.

INDEX TERMS

Medical Subject Headings (MeSH)

Bias; *Bipolar Disorder [psychology] [therapy]; Caregivers [psychology]; *Exercise [psychology]; Health Personnel [psychology]; Meta-Analysis as Topic; *Qualitative Research; Quality of Life; Systematic Reviews as Topic

MeSH check words

Humans